No. 16

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CONTENTS

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NOTES

WRITING IN 1946 IN THE FIRST NUMBER OF 'ANCIENT INDIA', [DR.] R. E. M. W[heeler] observed:

> 'A condition for the advancement of the study of India's great heritage is the widespread extension of archaeological research from the confines of a Government Department into the liberal activities of the universities and learned societies of India; from the monopoly of the civil servant to the free initiative of the educated public. Only then will it be possible for Indian archaeology, with its unsurpassed opportunities, to take a proper place amidst the free sciences of the world.'

The condition envisaged in this observation has been fulfilled to a considerable extent, and within a remarkably short period. Some Indian universities have now taken to archaeological work as one of their normal functions and have been doing work which would do credit to any organization. A few others have just entered the field. The Union Department of Archaeology has sometimes been giving limited grants-in-aid to these universities to supplement their own resources.

The situation has thus considerably changed in the course of the last decade or so. Over is the monopoly which was till recently held by the Union Department of Archaeology and which arose not out of the unwillingness of the Department to share its responsibilities with other organizations but out of the erstwhile non-existence of any worthy organization.

* * * * * *

At the same time, the risks arising out of laicization have to be guarded against in archaeology as in any other science. A prerequisite to an expansion of archaeological activities in the country is training, for it goes without saying that lack or inadequacy of training would lead to unskilled work and unreliable results, which are worse than no work and no results. Luckily, facilities for training in archaeology are also developing in the country.

For a long time past, a few Indian universities have been creditably running courses on some bookish aspects of archaeology which do not involve any field-work, such as epigraphy, numismatics, art, architecture, etc. It is by persons who underwent such courses or those in classical languages that, in the absence of a more suitable field of recruitment, the archaeological organizations of the country have been generally manned. But with the growth of interest in field-archaeology some universities have of late started courses in the more technical aspects of archaeology, including prehistoric and other archaeological cultures; a compulsory short-term training in the field also sometimes forms part of the course. The University Grants Commission have been encouraging with financial aid a limited number of universities in their endeavour in this direction.

The question has naturally arisen whether archaeology should form and be taught as an independent discipline or whether it should be a part of some allied subject—and that subject can only be history, for, notwithstanding the differences in approach and methods, the objectives of history and archaeology are the same, viz. the unveiling of Man's past. Though the science of archaeology has acquired a viability (this is not to deny its relations with and dependence on other sciences) and can be taught as an independent subject, with some necessary overlaps with a few branches of other subjects, most universities have preferred, at least to start with, to teach archaeology as a part of their course in history. This is no doubt a wise and practical step, for the students of archaeology should not be obsessed with the prospect of a very narrow opening before them after they leave the university.

Archaeology being essentially a field-science, a love for the field has to be inculcated in its students. The scholarly atmosphere of the universities, admirably suitable as it is for developing an academic outlook, may not necessarily provide the required background for the field-life that a student of archaeology should be prepared to take up subsequently. It would be well if from the very outset the teacher of archaeology takes adequate steps to create the right surroundings for his students.

* * * * * *

Keeping all this in mind, and with the primary intention of meeting the growing demand in the country for trained archaeologists, the Union Department of Archaeology itself has been running, since October 1959, a School of Archaeology, so that the students trained therein may be adequately equipped to adopt archaeology as their profession. For reasons stated above, the field of recruitment to the School is restricted to post-graduate students with history or a classical language as their subject. The number of students is limited to ten, so that the students may find ready employment after leaving the School.

The twenty-month course of the School is followed by an examination; the successful students are awarded a Diploma by the Government of India. The course consists of an intense practical training, together with some essential theoretical training in Indian archaeology. The lecturers to the School are generally drawn from the senior officers of the Department itself, but the help of distinguished archaeologists outside the Department is also largely drawn upon.

As is well-known, the official archaeological organizations in India, i.e. the Union and State Departments of Archaeology, are charged, in addition to explorations, excavations and general research, with the care and preservation of monuments. The course of the School therefore includes a thorough training in the principles and practice

of archaeological conservation and chemical preservation—a field in which the training imparted by the universities must necessarily lack.

The School has already won a ready recognition in India and even in some neighbouring countries: in the first year there was a student from Burma, and this year (1960) there is one from Nepal. There is no doubt that the School is destined to fulfil a genuine need in this part of the world.

A. Ghosh

Postscript.—Number 17 (1961) of this Bulletin was published punctually last year. Unfortunately, the publication of this Number, due in 1960, has been delayed by two years due to unavoidable circumstances. We apologize to our readers for the inconvenience caused to them.

A.G.

FROM THE MEGALITHIC TO THE HARAPPA: TRACING BACK THE GRAFFITI ON THE POTTERY

By B. B. Lal

CONTENTS

1. INTRODUCTORY

THE GRAFFITI ON THE MEGALITHIC POTTERY OF SOUTH INDIA HAVE LONG DRAWN THE attention of scholars, some of whom not merely collected the relevant data but also dwelt upon their probable significance and origin.[1] However, while having a look at the drawings of the graffiti from Sanur, the present author was particularly struck by the similarity of a rather specialized symbol with one in the Harappan script (below, p. 18, symbol 47, pl. XXXI B). This whetted his curiosity to find out if, how far and how many of the graffiti on the megalithic pottery could be traced backwards in time. Accordingly, a systematic

[1] B. R. Branfil, 'On the Savandurge rude stone cemetery, central Maisur', *Indian Antiquary*, X (1881), pp. 1-12; R. Bruce Foote, *Catalogue of Prehistoric Antiquities* (Madras, 1901), p. xvii; E. H. Hunt, 'Hyderabad Cairns', *Jour. Hyd. Arch. Soc.*, 1916, pp. 180-224; G. Yazdani, 'Megalithic remains of the Deccan—a new feature of them', *Jour. Hyd. Arch. Soc.*, 1917, pp. 56-79; G. Yazdani, *An. Rep. Arch. Dept. H.E.H. the Nizam's Dominions for the years 1915-16 and 1916-17* (Calcutta, 1917 and 1918 respectively), pp. 9-10 and 5-8 respectively; E. H. Hunt, 'Hyderabad cairn burials and their significance', *Jour. Roy. Anthrop. Inst.*, LIV (1924), pp. 140-56; Numa Laffitte, 'A note on certain signs inscribed on pottery found in ancient funeral urns in south India', *Indian Antiquary*, LX (1931), pp. 137-38; R. E. M. Wheeler, 'Brahmagiri and Chandravalli 1947: megalithic and other cultures in Mysore State', *Ancient India*, no. 4 (1947-48), pp. 244-45; J. M. Casal, *Fouilles de Virampatnam—Arikamedu* (Paris, 1949), pp. 53-54; J. M. et G. Casal, *Site urbain et site funeraires des environs de Pondicherry Virampatnam, Mouttrapaleon, Souttoukeny*, Publications de la Commission de Fouilles archeologiques—fouilles de l'Inde (Paris, 1956), p. 70; B. K. Thapar, 'Maski 1954: a chalcolithic site of the southern Deccan', *Ancient India*, no. 13 (1957), pp. 86-88; N. R. Banerjee, 'Sanur 1950 and 1952: a megalithic site in District Chingleput', *Ancient India*, no. 15 (1959), pp. 30-34.

survey of the available material from the Christian era backwards to the Harappan times has been undertaken. As the graffiti had sometimes been scratched only faintly, it is not always possible to get a clear-cut idea of the symbol as originally conceived. Thus, line-drawings thereof are likely to introduce an element of subjectivity. It was, therefore, thought desirable not to depend entirely on the published line-drawings but to study all the symbols in the original and photograph them individually even though the work might involve a great deal of time, labour and expenditure. While an exhaustive study and photography of the entire material is likely to take time, it is considered worth while to place before scholars a preliminary note on the results of the survey.

On the megalithic side, the available material from the following sites has so far been studied (fig. 1): Adichanallur, District Tirunelveli, Madras; Chandravalli, District Chitaldrug, Mysore; Chikkajala, District Bangalore, Mysore; Feroke, District Kozhikode, Kerala; Gadiganuru, District Bangalore, Mysore; Jadigenahalli, District Bangalore, Mysore; Kunnattur, District Chingleput, Madras; Maski, District Raichur, Mysore; Sanur, District Chingleput, Madras; Savandrug, District Bangalore, Mysore; T. Narasipur, District Mysore; Tozhupedu (Perumbair), District Chingleput, Madras; Vellalur, District Coimbatore, Madras; and Virampatanam, Pondicherry. In addition was studied the collection (lodged in Government Museum, Madras) from Districts Coimbatore, Coorg, Madurai, North Arcot and South Arcot—all in Madras State, the exact provenance, however, being not readily available. Similar was the position in respect of the material lodged in the Hyderabad Museum, Hyderabad. In all these cases, however, it was duly confirmed that the material did come from megalithic sites.

In the pre-megalithic context comes the material from the Harappa and post-Harappan chalcolithic cultures. So far the following sites have been studied (fig. 1): Amri, District Karachi, West Pakistan; Bahal, District Jalgaon, Maharashtra; Chandoli, District Poona, Maharashtra; Harappa, District Montgomery, West Pakistan; Kalibangan, District Ganganagar, Rajasthan; Korat, District Dhulia, Maharashtra; Lothal, District Ahmadabad, Gujarat; Mohenjo-daro, District Larkana, West Pakistan; Navdatoli, District Nimar, Madhya Pradesh; Nevasa, District Ahmadnagar, Maharashtra; Prakash, District Dhulia, Maharashtra; Rangpur, District Surendranagar, Gujarat; and Tekwada, District Jalgaon, Maharashtra.

While most of the publications referred to in the opening paragraph of this paper deal with graffiti from a particular site only, incorporating, no doubt, a few generalized remarks as well, Yazdani's paper published in the *Journal of the Hyderabad Archaeological Society* deals with the material from various sites, thus making the approach more comprehensive.[1] The latter publication, therefore, would have formed a suitable basis for the present study, had it not been for the fact that therein the same symbol, with hardly any basic variation, occurs under different numbers. For example, numbers 1, 2, 6, 7 and 9 represent the same basic symbol, even the inverted positions of numbers 2 and 7 being explainable by the way in which the pot was handled at the time of the scratching of the symbol. Likewise, numbers 16-20 represent the same 'arrow'-conception, their individual directions, however, again depending on the handling of the pot at the time of scratching. Or, the number of horizontal strokes in symbols 80-89 may or may not be of much consequence. Further, under certain numbers there is either a duplica-

[1] Incidentally, in this and his other two papers already referred to, Yazdani seeks to identify several of the graffiti with letters of the Etruscan alphabet. However, in all fairness, it must be added that the material from Harappan or post-Harappan chalcolithic sites discussed in the present paper was not available when he wrote his papers in 1916-18.

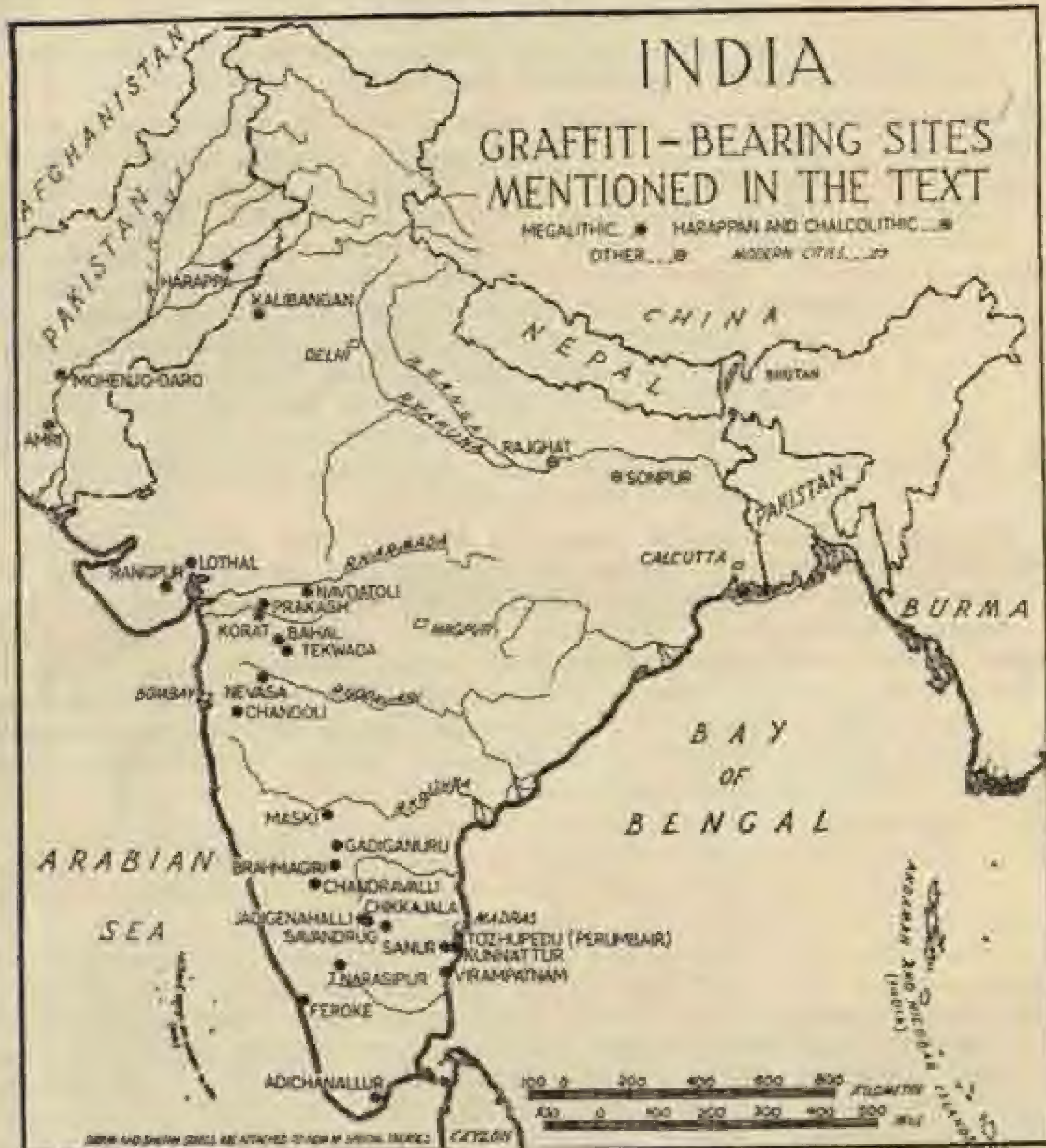

INDIA
GRAFFITI-BEARING SITES
MENTIONED IN THE TEXT
AFGHANISTAN
PAKISTAN
HARAPPA
KALIBANGAN
DELHI
MOHENJO-DARO
AMRI
CHINA
NEPAL
BHUTAN
RAJGHAT
SONPUR
PAKISTAN
LOTHAL
RANGPUR
CALCUTTA
NAVDATOLI
PRAKASH
KORAT
BAHAL
TEKWADA
BURMA
BOMBAY
NEVASA
CHANDOLI
BAY
OF
BENGAL
MASKI
GADIGANURU
ARABIAN
BRAHMAGIRI
CHANDRAVALLI
SEA
CHIKKAJALA
JADIGENAHALLI
MADRAS
SAVANDRUG
SANUR
TOZHUPEDU (PERUMBAIR)
KUNNATTUR
T.NARASIPUR
VIRAMPATNAM
FEROKE
ADICHANALLUR
CEYLON

FIG. 1

tion of the same symbol (for example, no. 29) or a combination of two or more already-numbered symbols (for example, nos. 26, 72-75, etc.). In fact, a scrutiny on the above lines of the one hundred and thirtyone symbols tabulated by Yazdani would indicate that they do not actually number more than fifty. With much reluctance, therefore, the present writer has to break away from the serial numbers of Yazdani and to start afresh. However, an attempt will be made first to cover the symbols mentioned by Yazdani, whereafter new symbols will be dealt with.

2. DESCRIPTION OF THE SYMBOLS

A. Symbols common to the megalithic pottery on the one hand and the Harappan and post-Harappan chalcolithic pottery on the other

(i) *Symbol 1* (pl. I)

The symbol consists of two oblique lines joining each other at the upper end. It roughly resembles the early Brāhmī letter *ga*. The inverted position in example 5 may perhaps be explained by the way in which the pot was handled at the time of scratching. In this connexion, particular attention may also be drawn to the disposal of the symbol in example 6.

The particulars in respect of the illustrated examples are as follows.

1. Exact provenance indefinite;[1] megalithic; red ware; post-firing; Hyderabad Museum, Hyderabad (HMH).[2]
2. Amri; Harappan; red ware; pre-firing; ASI.
3. Harappa; Harappan; red ware; pre-firing; ASI.
4. Korat; chalcolithic; black-and-red ware; post-firing; ASI.
5. District North Arcot;[3] megalithic; Black-and-red Ware; post-firing; GMM.
6. Lothal; Harappan (Lothal A); red ware; post-firing; ASI.

(ii) *Symbol 2* (pl. II)

The symbol consists of an oblique line joined about its middle by a smaller, oblique stroke. It roughly resembles the early Brāhmī letter *ta*. The smaller stroke is either on the right or left, depending on the direction of the larger line.

The particulars in respect of the illustrated examples are as follows.

1. Exact provenance indefinite; megalithic; black ware; post-firing; HMH.
2. Harappa; Harappan; seal.[4]

[1]At the time of the study of the collection in the Hyderabad Museum, Hyderabad, the exact name of the site was not available. It was, however, duly ascertained that this and other pots from that Museum illustrated in this paper belonged to the megalithic culture.

[2]The other abbreviations used in the text are as follows: ASI=Archaeological Survey of India; GMM=Government Museum, Madras; DCP=Deccan College and Post-graduate Research Institute, Poona; GMB=Government Museum, Bangalore; DAM=Department of Archaeology, Government of Mysore, Mysore; PWMB=Prince of Wales Museum, Bombay.

[3]In this and similar cases the exact name of the site was not available. The cultural context, however, was duly ascertained.

[4]M. S. Vats, *Excavations at Harappa*, II (Calcutta, 1940), pl. XCII, *283*.

3. Yazdani no. 5; megalithic; GMM.
4. Harappa; Harappan; seal.[1]

(iii) *Symbol 3* (pl. III A)

The symbol roughly resembles a trident. In a variant form (example 5), a horizontal line cuts it at the junction of the prongs. In another variant (example 6), the prongs are at both the ends.

The following are the particulars of the illustrated examples.

1. Sanur; megalithic; Black-and-red Ware; post-firing; ASI.
2. Harappa; Harappan; seal.[2]
3. Sanur; megalithic; red ware; post-firing; ASI.
4. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.

5 and 6. Navdatoli; chalcolithic; red wares; post-firing; DCP.

(iv) *Symbol 4* (pl. III B)

The symbol consists of two oblique lines joining each other at their upper ends. Joining or passing near the junction is another set of two, less oblique, lines, as a result of which the angle formed by the earlier set of lines is divided into three parts.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; red ware; post-firing; (overriden by another symbol); DAM.
2. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
3. Feroke; megalithic; red ware; post-firing; GMM.

(v) *Symbol 5* (pl. IV)

The symbol resembles an arrow.

The particulars of the illustrated examples are as follows.

1. Sanur; megalithic; Black-and-red Ware; post-firing; ASI.
2. Feroke; megalithic; red ware; post-firing; GMM.
3. Savandrug; megalithic; Black-and-red Ware; post-firing; GMB.
4. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
5. Amri; Harappan; buff ware; pre-firing; ASI.
6. Kalibangan; Harappan; red ware; pre-firing; ASI.
7. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.
8. Rangpur; chalcolithic (Rangpur II C); coarse red ware; post-firing; ASI.
9. Prakash; chalcolithic; black-on-red ware; post-firing; ASI.

(vi) *Symbol 6* (pls. V and VI)

The symbol consists of two oblique lines crossing each other. The two ends of each line are further joined with corresponding ends of the other line by means of a smaller

[1] Vats, *op. cit.*, pl. CI, *693*.
[2] *Ibid.*, pl. LXXXIX, *126*.













Symbol 1: 1 and 5, megalithic; 2 3 and 6, Harappan; and 4, chalcolithic. Scale: [illegible]. *See p. 7*

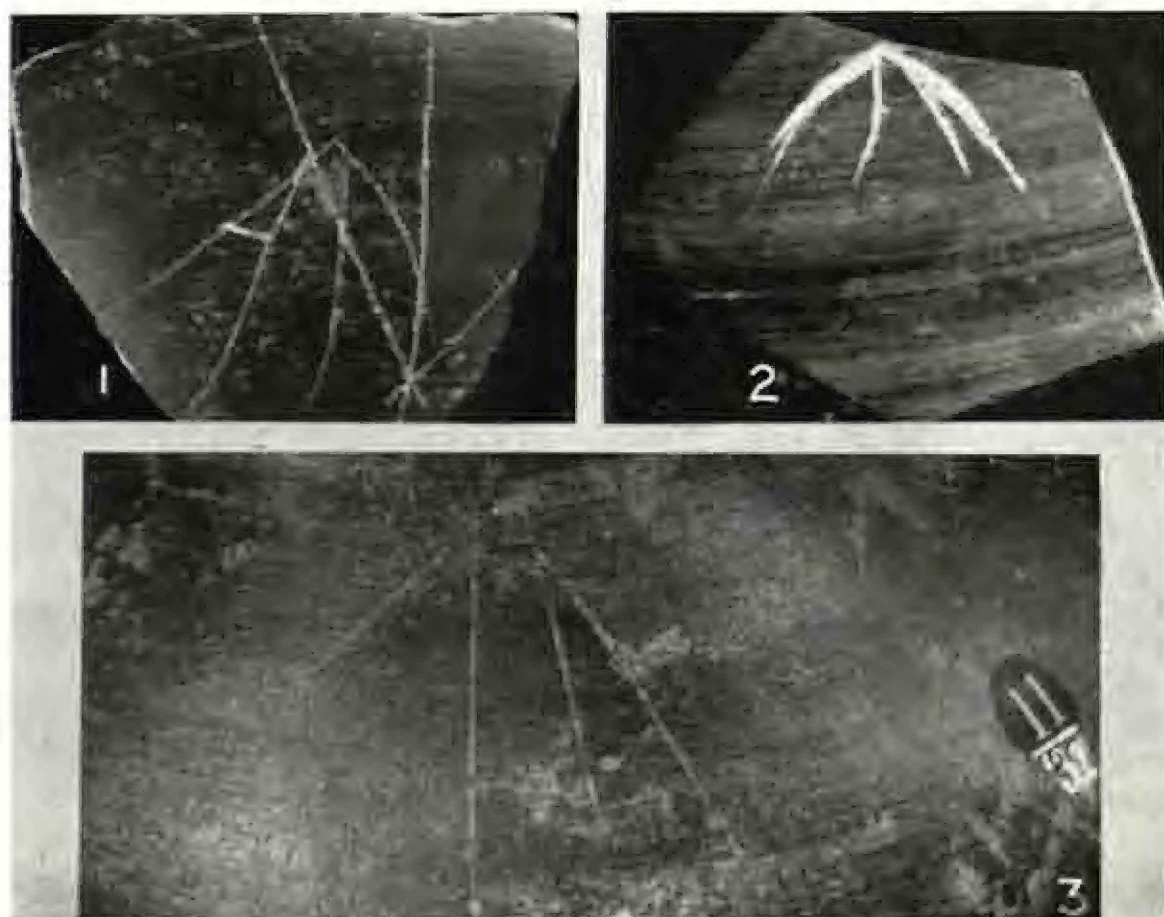
To face p. 8



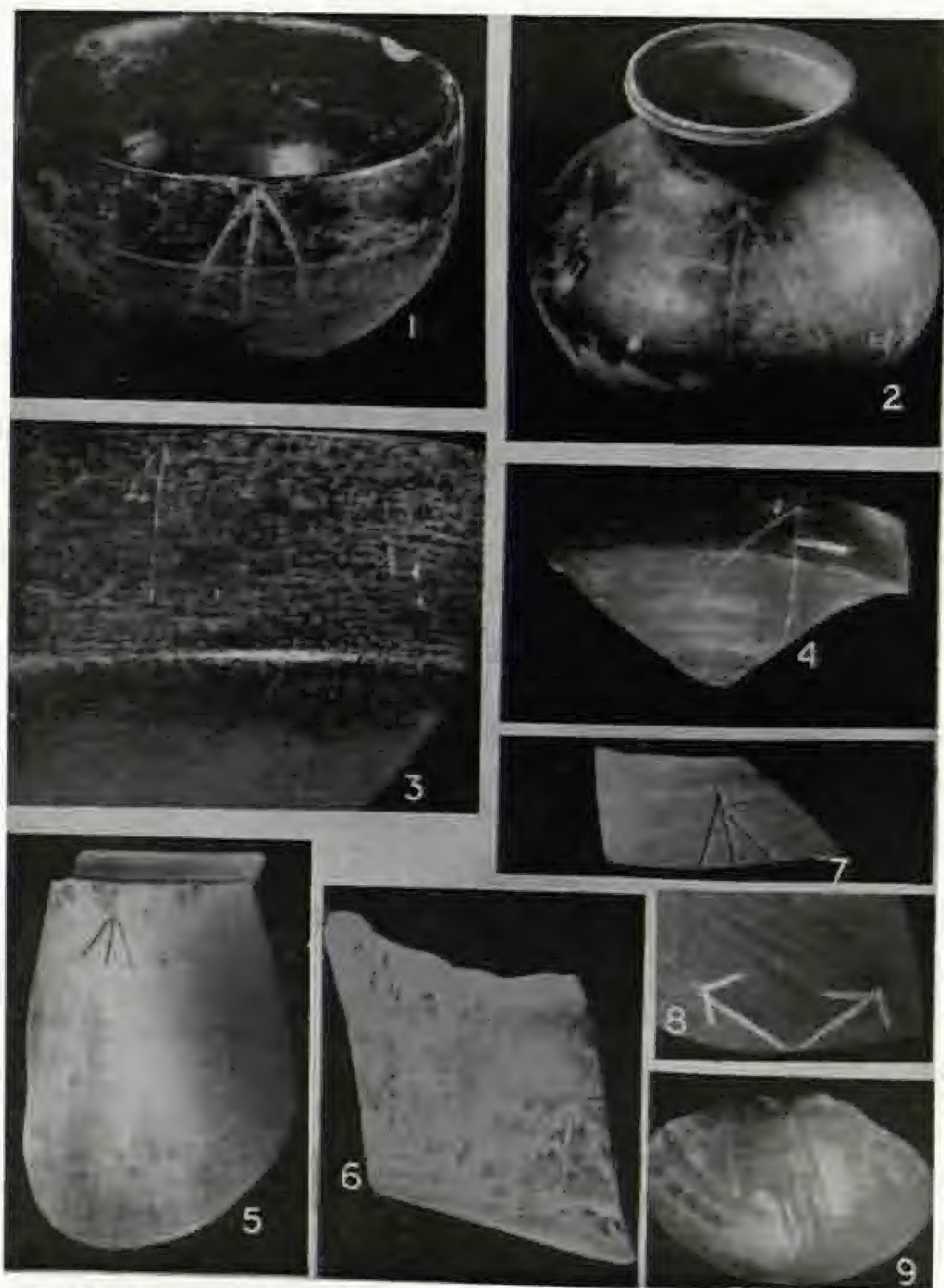
Symbol 2: *1 and 3, megalithic; and 2 and 4, Harappan. Approximate scales: 1, 1/3; 2, 2/1; 4, 1/1; and 3, not to scale.* *See p. 7*



A. *Symbol 3: 1 and 3, megalithic; 2, Harappan; and 4-6, chalcolithic. Scale: 1 and 3-5, $\frac{4}{5}$; 2, $\frac{3}{2}$; and 6, $\frac{1}{2}$.* *See p. 8*



B. *Symbol 4: 1 and 3, megalithic; and 2, chalcolithic. Scale: $\frac{4}{5}$.* *See p. 8*



Symbol 5: 1-4, megalithic; 5 and 6, Harappan; and 7-9, chalcolithic. Scale: ⅓. See p. 8

To face pl. V















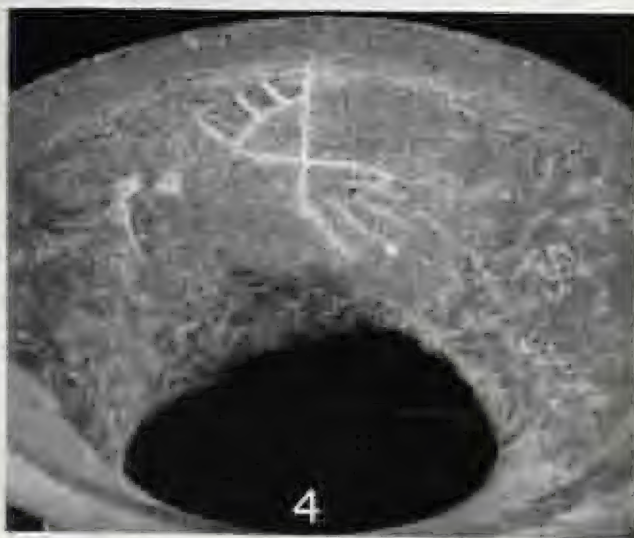
Symbol 6: 1, 2 and 5, megalithic; 3, Harappan; and 4, 6 and 7, chalcolithic. Scale: $\frac{2}{3}$. *See p. 8*

To face pl. IV





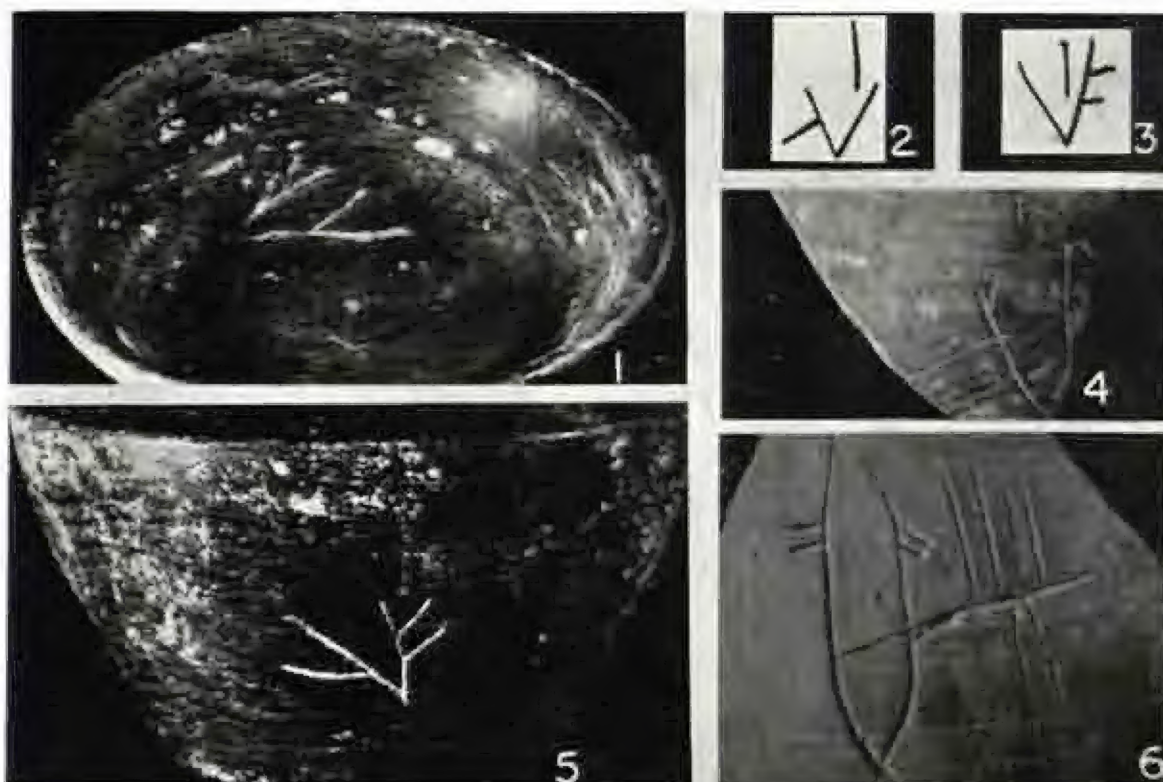








Symbol 6 (variants): 1, 3, 5 and 6, chalcolithic; and 2 and 4, megalithic. Scale: $\frac{2}{3}$. *See p. 9*

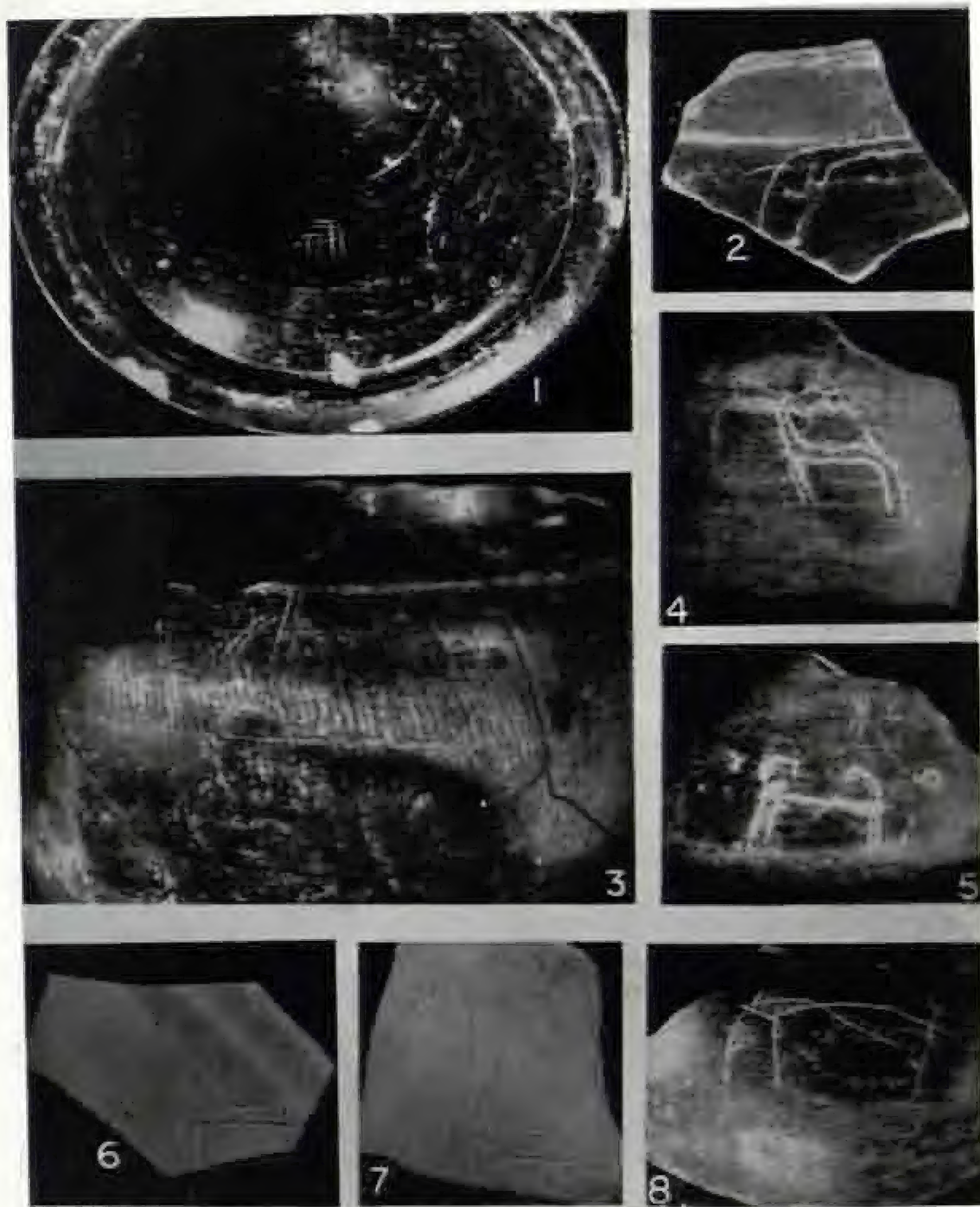


A. *Symbol 7: 1 and 5, megalithic; 2 and 3, chalcolithic; and 4 and 6, Harappan. Scale: 1 and 4-6, $\frac{1}{3}$; and 2 and 3, not to scale.* *See p. 9*



B. *Symbol 8: 1 and 2, megalithic; and 3, Harappan. Scale: 1 and 2, $\frac{1}{3}$; and 3, $\frac{1}{1}$.* *See p. 9*

To face pl. VI



Symbol 9: 1-3 and 8, megalithic; 4-7, chalcolithic. Scale: ⅔. See p. 10

To face p. 9

line. The symbol may be said to resemble a *ḍamaru* in outline, or may be called a case of two triangles meeting each other at the apex.

The particulars of the illustrated examples of the symbol (pl. V) are as follows.

1. T. Narasipur; megalithic; dull-red to grey ware; pre-firing; DAM.
2. Gadiganuru; megalithic; red ware; post-firing; ASI.
3. Mohenjo-daro; Harappan; red ware; pre-firing; ASI.
4. Navdatoli; chalcolithic; red ware; post-firing; DCP.
5. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
6. Rangpur; chalcolithic; Lustrous Red Ware; post-firing; PWMB.
7. Korat; chalcolithic; black-and-red ware; post-firing; ASI.

The symbol has several variants. In variant 6a (pl. VI, *1* and *2*), an additional line cuts across the symbol passing through or near the junction of the two triangles. Variant 6b (pl. VI, *3*) appears to be a closely-knit duplication of variant 6a. In variant 6c (pl. VI, *4*) a series of small strokes emanates outwards from the bases of each of the two opposed triangles. Variant 6d (pl. VI, *5*) combines the features of variants 6a and 6c. In variant 6e (pl. VI, *6*) there is a small loop encircling each of the outer corners of the triangles.

The particulars of the illustrated examples are as follows.

1. Rangpur; chalcolithic; Lustrous Red Ware; post-firing; PWMB.
2. Adichanallur; megalithic; red ware; post-firing; GMM.
3. Prakash; chalcolithic; white-painted black-and-grey ware; post-firing; ASI.
4. Provenance indefinite; megalithic; red ware; post-firing; GMM.
5. Navdatoli; chalcolithic; red ware; post-firing; DCP.
6. Rangpur; chalcolithic; red ware; post-firing; PWMB.

(vii) *Symbol 7* (pl. VII A)

The symbol consists of two oblique lines joining each other at their lower ends, thus looking like the English letter V. Joining one of or, more commonly, both the arms, usually on the outer side, are one or two strokes. There is also sometimes a vertical stroke within or above the V.

The particulars of the illustrated examples are as follows.

1. Vellalur; megalithic; red ware; post-firing; GMM.

2 and 3. Rangpur; chalcolithic; ASI.

4. Lothal; late Harappan (Lothal B); red ware; post-firing; ASI.
5. Vellalur; megalithic; Russet-coated Painted Ware; post-firing; GMM.
6. Kalibangan; Harappan; red ware; post-firing; ASI.

(viii) *Symbol 8* (pl. VII B)

The symbol consists of two pairs of vertical lines, the upper ends of which are joined by a pair of horizontal lines. The symbol gives the impression of the jambs and lintel of a doorway.

The particulars of the illustrated examples are as follows.

1. Tozhupedu (Perumbair); megalithic; Black-and-red Ware; post-firing; GMM.
2. Provenance indefinite; megalithic; red ware; post-firing; HMH.

3. Kalibangan; Harappan; sealing; ASI.

(ix) *Symbol 9* (pl. VIII)

In its most easily recognizable form, the symbol depicts, almost realistically, a deer (for example, no. 4). Herein the body is hatched and the horns are wavy. Gradually, the figure becomes stylized, the fore and hind legs being depicted by pairs of vertical strokes, the outline of the body and horns by pairs of horizontal strokes and the tail by another oblique stroke (for example, no. 1). The most conventionalized forms are represented by nos. 3 and 5.

The particulars of the illustrated examples are as follows.

1. District Coimbatore; megalithic; black ware; post-firing; GMM.
2. T. Narasipur; megalithic; red ware; post-firing; DAM.
3. North Arcot; megalithic; Black-and-red Ware; post-firing; GMM.
4. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
5. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
6. Navdatoli; chalcolithic; red ware; post-firing; DCP.
7. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.
8. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.

(x) *Symbol 10* (pl. IX A)

The symbol consists of a vertical and a horizontal line cutting each other approximately at the middle at an angle of roughly 90°. It resembles the plus sign.

The particulars of the illustrated examples are as follows.

1. Lothal; Harappan; terracotta 'cake'; post-firing; ASI.
2. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.

(xi) *Symbol 11* (pl. IX B)

The symbol consists of two oblique lines cutting each other at an acute (obtuse) angle. It roughly resembles the sign of multiplication.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
2. Harappa; Harappan; photograph with ASI.
3. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
4. Provenance indefinite; megalithic; post-firing; HMH.

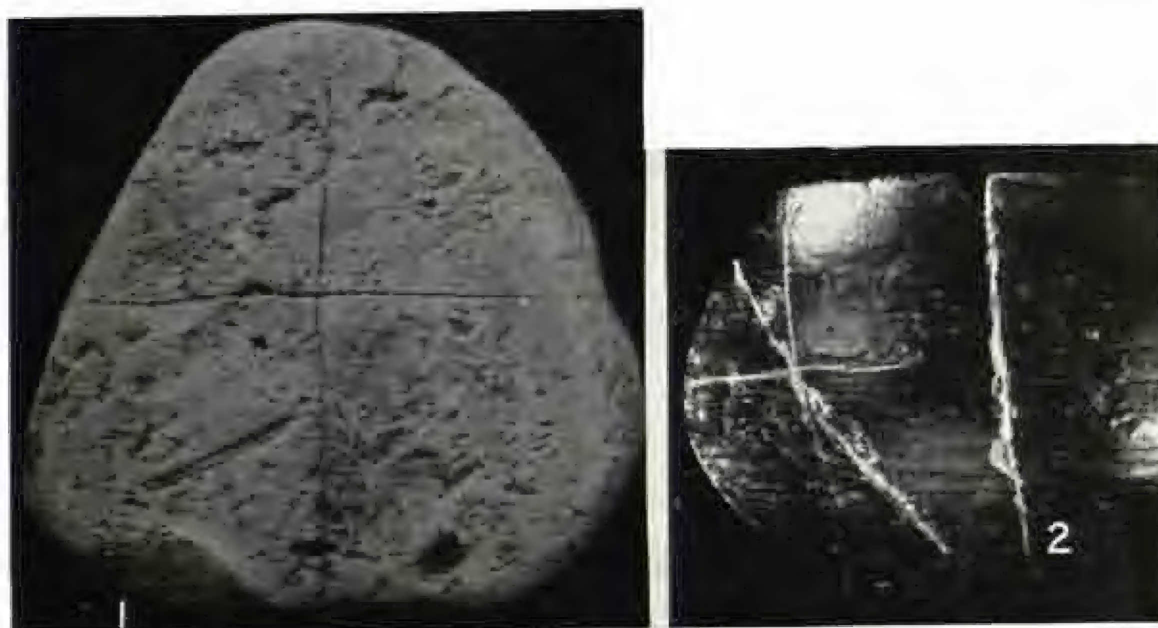
(xii) *Symbol 12* (pl. X A)

The symbol consists of two vertical lines cut by two horizontal lines. It roughly forms a square or oblong.

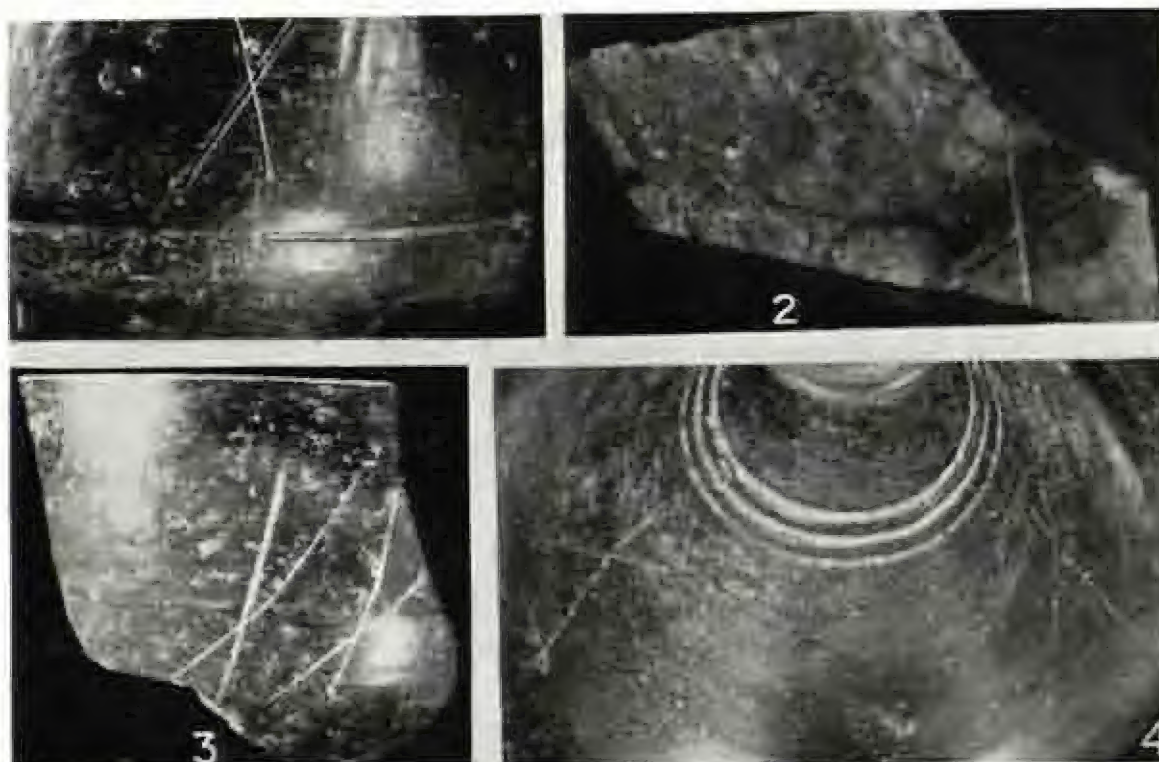
The particulars of the illustrated examples are as follows.

1. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI
2. Virampatnam; megalithic.[1]

[1] Casal, *op. cit.* (1949), fig. 20, no. 111.

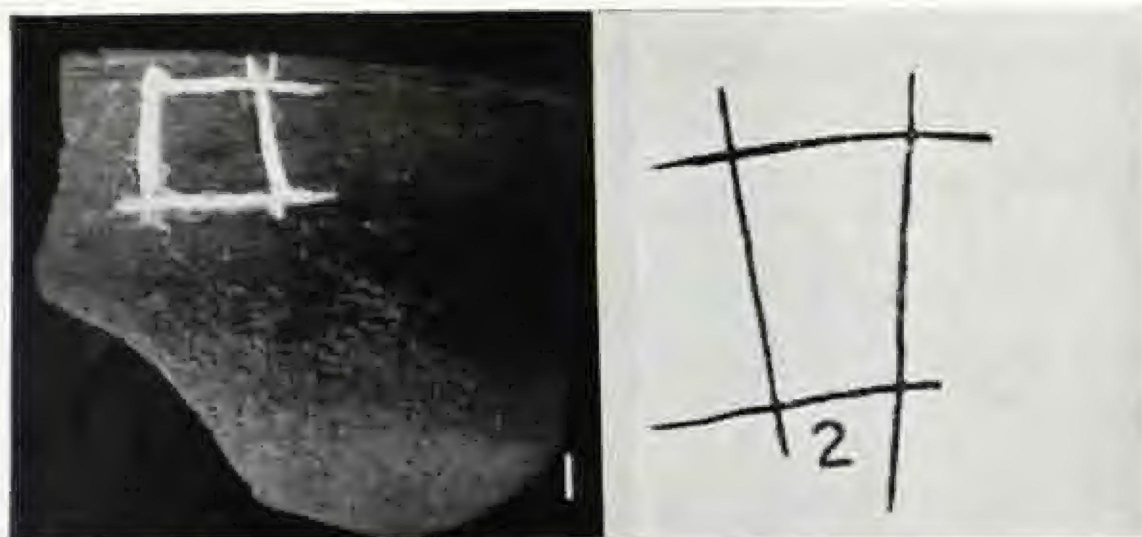


A. *Symbol 10: 1, Harappan; and 2, megalithic. Scale: $\frac{1}{3}$. See p. 10*

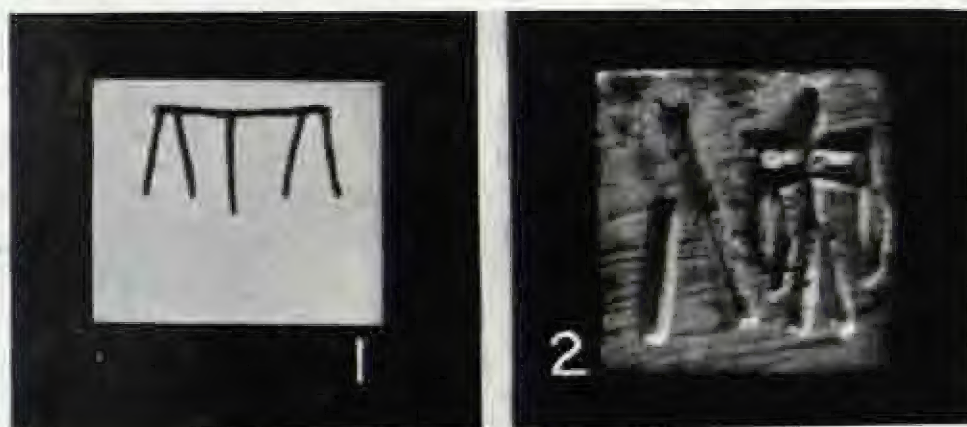


B. *Symbol 11: 1, 3 and 4, megalithic; and 2, Harappan. Scale: $\frac{2}{3}$. See p. 10*

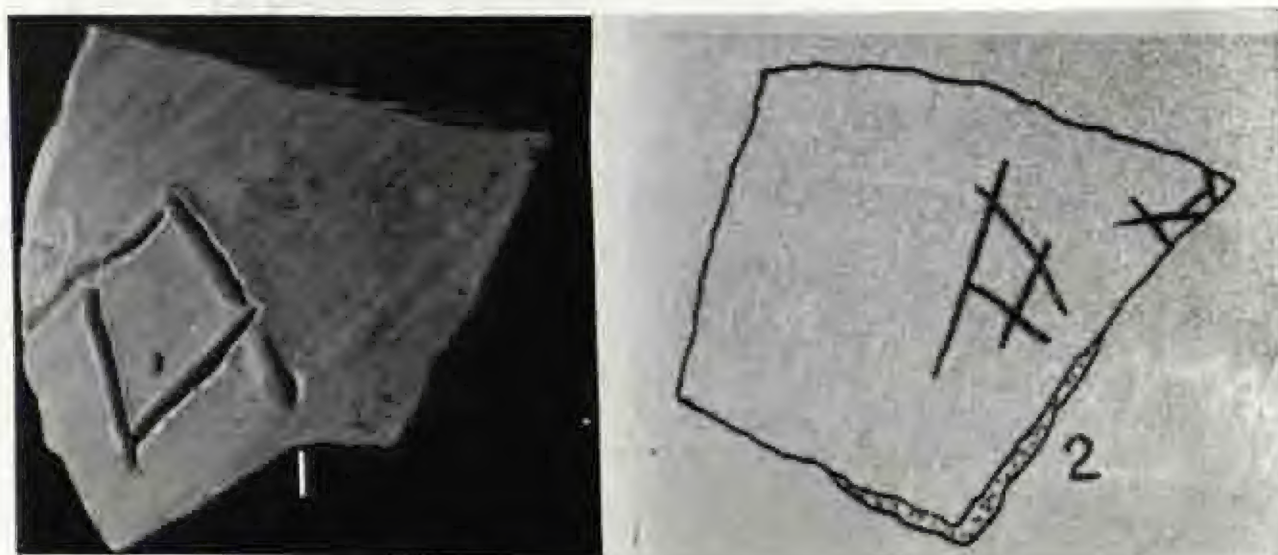
To face p. 10



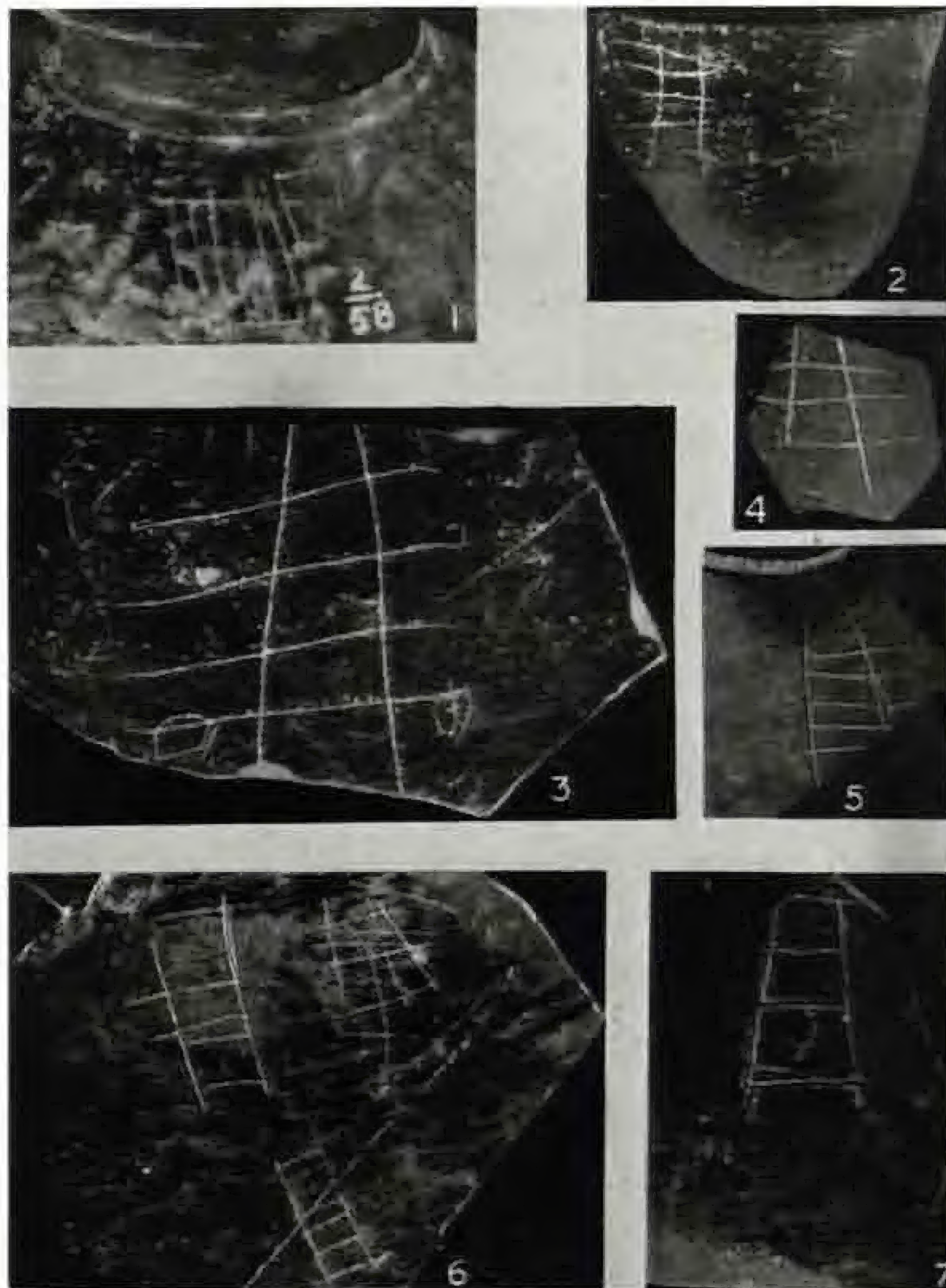
A. *Symbol 12: 1, chalcolithic; and 2, megalithic. Scale: 1, $\frac{1}{1}$; and 2, not to scale.* *See p. 10*



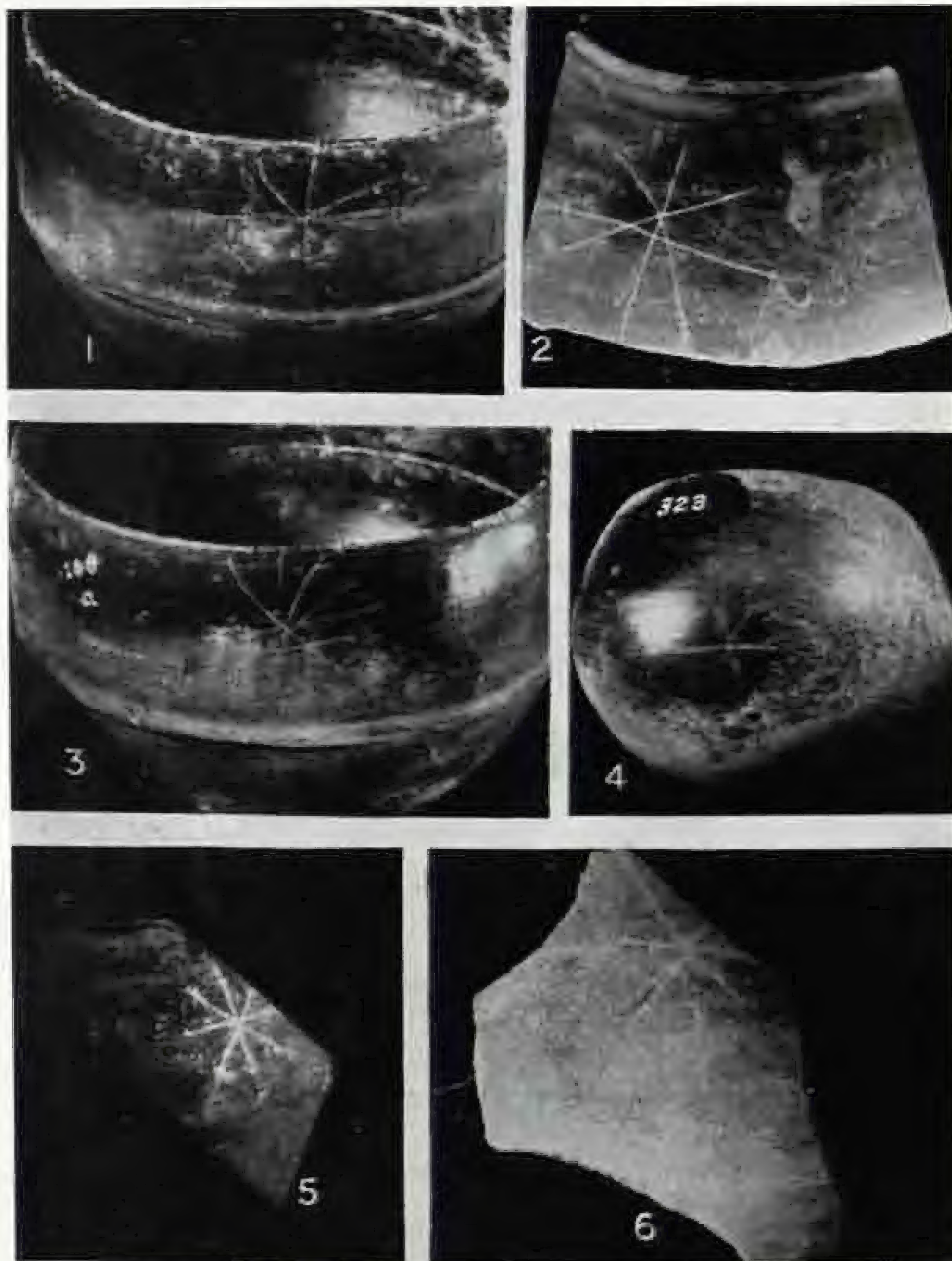
B. *Symbol 13: 1, megalithic; and 2, Harappan. Scale: 2, [illegible]; and 1, not to scale.* *See p. 11*



C. *Symbol 14: 1, Harappan; and 2, megalithic. Scale: 1, $\frac{1}{1}$; and 2, not to scale.* *See p. 11*

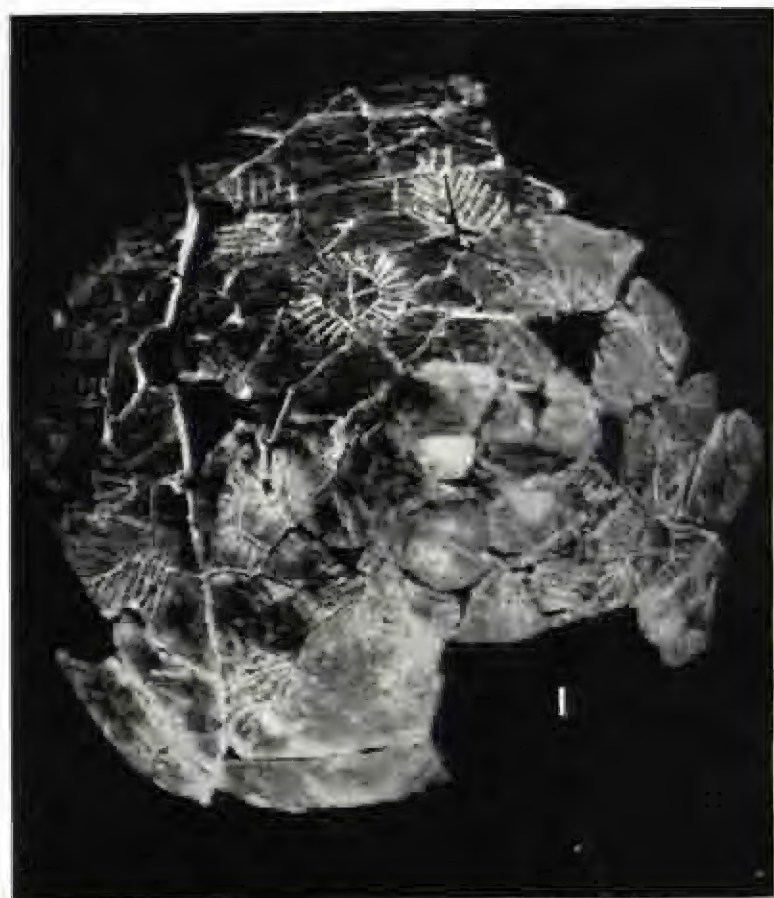


Symbol 15: 1-3, megalithic; 4, 5 and 7, chalcolithic; and 6, Harappan. Scale: [illegible]. *See p. 11*



Symbol 16: 1-4, megalithic; 5, chalcolithic; and 6, Harappan. Scale: $\frac{2}{3}$. See p. 11

To face pl. XIII













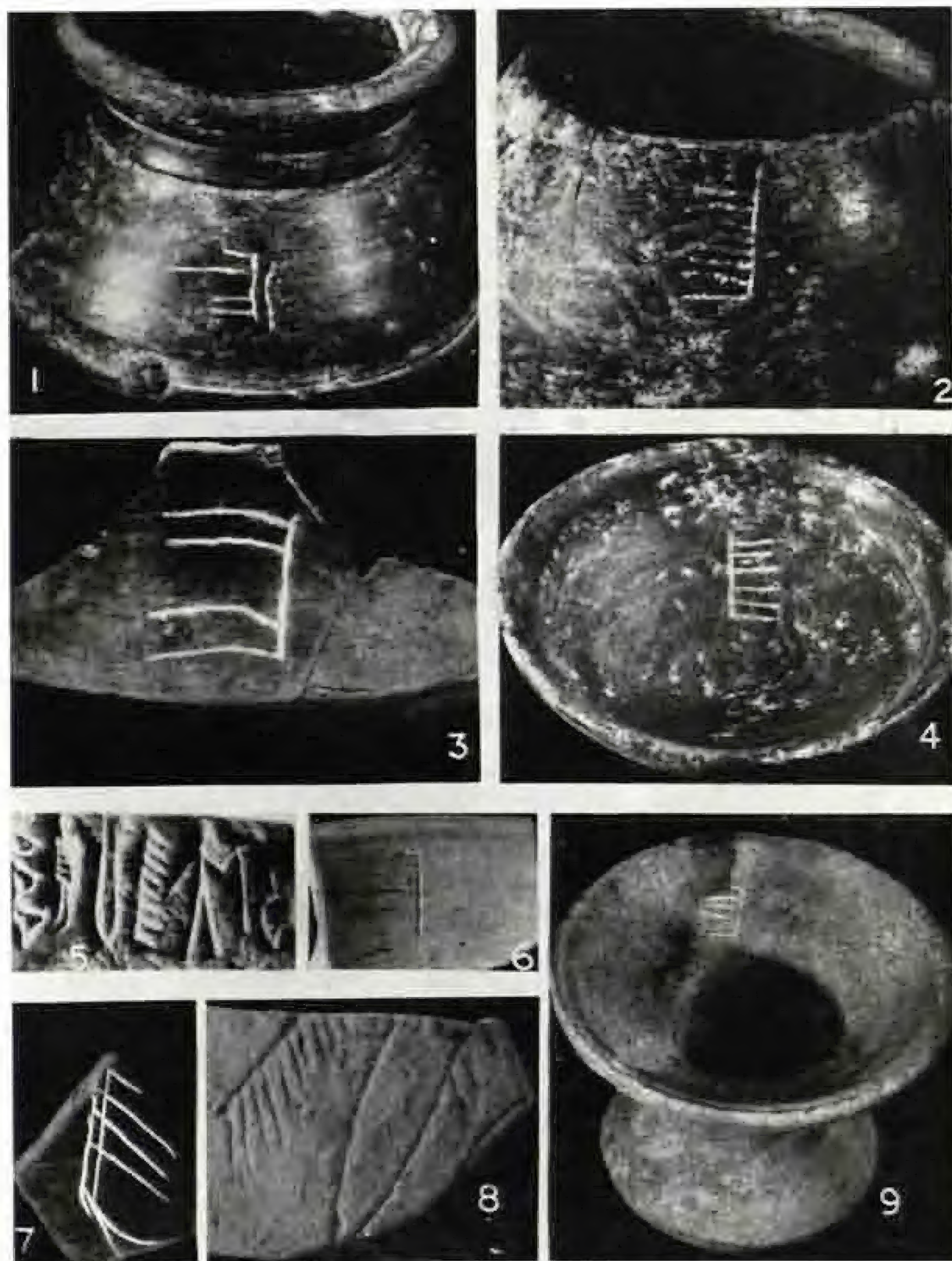
Symbol 17: 1 and 4, megalithic; and 2, 3, 5 and 6, chalcolithic. Scale: 1-3, 5 and 6, ½; and 4, not to scale. *See p. 12*

To face pl. XII



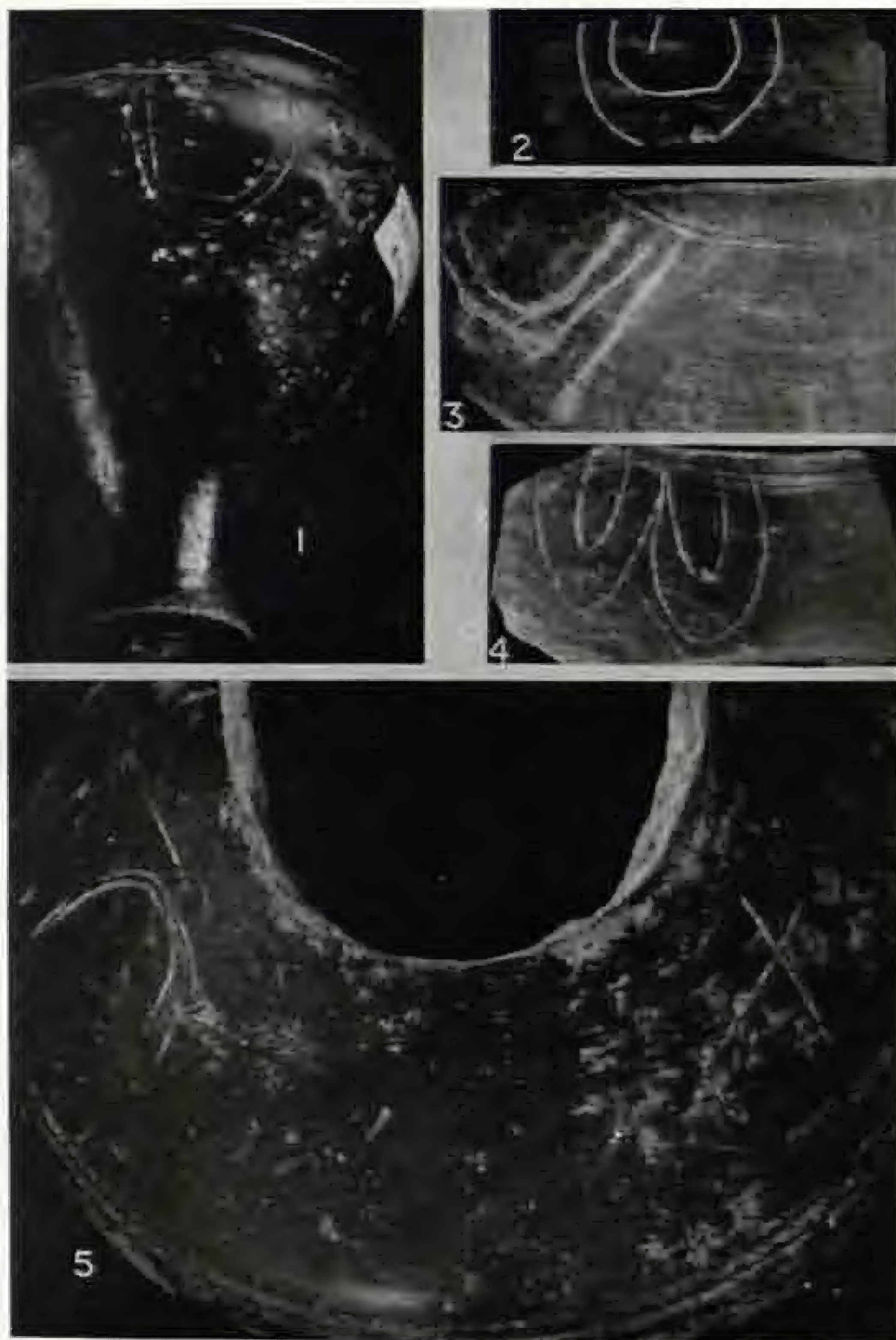
Symbol 18: 1 and 2, megalithic; 3 and 5, Harappan; and 4 and 6, chalcolithic. Scale: 1, 2, 4 and 6, $\frac{2}{3}$; and 3 and 5, $\frac{3}{1}$. *See p. 12*

To face pl. XV



Symbol 19: 1, 2, 4 and 9, megalithic; 3 and 7, chalcolithic; and 5, 6 and 8 Harappan. Scale: 5, $\frac{3}{4}$; and rest $\frac{2}{1}$. *See p. 13*

To face pl. XIV



Symbol 20: 1, 4 and 5, megalithic; and 2 and 3, chalcolithic. Scale: $\frac{2}{3}$. See p. 13

To face p. 11

(xiii) *Symbol 13* (pl. X B)

The symbol consists of a horizontal line joined, at its middle, by a vertical line going downwards. At each end of the horizontal line is a pair of opposing oblique strokes. The symbol may perhaps be regarded as a simplified or devolved version of an equipoise, such as depicted in no. 2, resting on a vertical rod.

The particulars of the illustrated examples are as follows.

1. Yazdani no. 78; megalithic; GMM.
2. Kalibangan; Harappan; seal; ASI.

(xiv) *Symbol 14* (pl. X C)

The symbol may be said to be a stylized representation of the fish.

The particulars of the illustrated examples are as follows.

1. Kalibangan; Harappan; red ware; pre-firing; ASI.
2. Virampatnam; megalithic.[1]

(xv) *Symbol 15* (pl. XI)

The symbol consists of two vertical lines cut by a series of horizontal and comparatively small lines. It looks like a ladder, which in rare cases (for example, no 1) is placed horizontally.

The particulars of the illustrated examples are as follows.

1. Tozhupedu (Perumbair); megalithic; red ware; post-firing; GMM.
2. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
3. T. Narasipur; megalithic; red ware; post-firing; DAM.
4. Chandoli; chalcolithic; red ware; post-firing; DCP.
5. Nevasa; chalcolithic; black-on-red ware; post-firing; DCP.
6. Kalibangan; Harappan; black-on-red ware; post-firing; ASI.
7. Rangpur; chalcolithic; black-on-red ware; post-firing; PWMB.

(xvi) *Symbol 16* (pl. XII)

The symbol usually consists of four lines cutting one another at a common central point. Of these lines, one is vertical, another horizontal and two are oblique drawn in diagonally opposite directions. In the variants, there may be an absence of the vertical line (for example, no. 4) or an addition of one or more horizontal, oblique or vertical lines (for examples, no. 3).

The particulars of the illustrated examples are as follows.

1. District North Arcot; megalithic; Black-and-red Ware; post-firing; GMM.
2. T. Narasipur; megalithic; red ware; post-firing; DAM.
3. District North Arcot; megalithic; Black-and-red Ware; post-firing; GMM.
4. Tozhupedu (Perumbair); megalithic; Black-and-red Ware; post-firing; GMM.
5. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI.
6. Lothal; late Harappan (Lothal B); coarse red ware; post-firing; ASI.

[1] Casal, *op. cit.* (1949), fig. 20, no. XXV.

(xvii) *Symbol 17* (pl. XIII)

The symbol consists of a circle from the circumference of which radiates outwards a series of strokes. It may be regarded as the conventional representation of the sun with its rays. In a variant form (example 1), the circle also has two right-angle-to-each-other diameters.

The particulars of the illustrated examples are as follows.

1. Kunnattur; megalithic; black ware; post-firing; ASI.
2 and 3. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI.
4. Yazdani no. 70; megalithic.
5. Prakash; chalcolithic; white-painted black-and-grey ware; post-firing; ASI.
6. Bahal; chalcolithic; red ware; post-firing; ASI.

(xviii) *Symbol 18* (pl. XIV)

Under this number are included the varieties of the *swastika*. The simplest form consists of two lines, one vertical and another horizontal, cutting each other at right angles. From the four ends of these lines are drawn straight or oblique strokes or small loops, running clockwise (for example, no. 6) or anti-clockwise (for example, nos. 4 and 5). In a variant form, the strokes are in twos (for example, no. 1). In still another variant, even vertical and horizontal lines are in twos (for example, no. 2).

The particulars of the illustrated examples are as follows.

1. District Coorg; megalithic; Black-and-red Ware; post-firing; GMB.
2. District Coimbatore; megalithic; red ware; post-firing; GMM.
3. Mohenjo-daro; Harappan; seal.[1]
4. Rangpur; chalcolithic; red ware; post-firing; PWMB.
5. Mohenjo-daro; Harappan; seal.[2]
6. Navdatoli; chalcolithic; red ware; post-firing; DCP.

(xix) *Symbol 19* (pl. XV)

The symbol usually consists of a vertical line joined by a series of horizontal strokes. Rarely, there may be another vertical line close and parallel to the first one (for example nos. 1 and 7). In a few cases (nos. 5, 7 and 8) the lines and strokes are slightly oblique. In the illustrations the horizontal strokes are seen sometimes on the right and sometimes on the left. However, the disposal of the symbol in the Harappan inscriptions (for example, nos. 5 and 8) indicates that the strokes were actually meant to be on the right. The left-sided position of the strokes in certain cases, therefore, may perhaps be explained by the way the pot was handled at the time of scratching.

The particulars of the illustrated examples are as follows.

1. District North Arcot; megalithic; red ware; post-firing; GMM.
2. District North Arcot; megalithic; Russet-coated Painted Ware; post-firing; GMM.
3. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI.
4. District Coimbatore; megalithic; tan-red ware; post-firing; GMM.

[1] E. J. H. Mackay, *Further Excavations at Mohenjo-daro*, II (New Delhi, 1937), pl. LXXXVI, *172*.
[2] *Ibid.*, pl. LXXXII, *3*.

5. Mohenjo-daro; Harappan; seal.[1]
6. Lothal; Harappan (Lothal A); red ware; post-firing; ASI.
7. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI.
8. Kalibangan; Harappan; red ware; post-firing; ASI.
9. District Mysore; megalithic; red ware; post-firing; GMM.

(xx) *Symbol 20* (pl. XVI)

The symbol consists of a set of two parallel loops. Sometimes there is another similar set placed alongside it (for example, no. 4).

The particulars of the illustrated examples are as follows.

1. Savandrug; megalithic; post-firing; GMB.
2. Rangpur; chalcolithic (Rangpur II C); coarse red ware; post-firing; ASI.
3. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
4. T. Narasipur; megalithic; red ware; post-firing; DAM.
5. Jadigenahalli; megalithic; Black-and-red Ware; post-firing; DAM.

(xxi) *Symbols 21 and 22* (pl. XVII A)

The symbols consist respectively of sets of three or four parallel loops. Alternatively, they may be regarded as extensions of symbol 20.

The particulars of the illustrated examples are as follows.

1. Savandrug; megalithic; red ware; post-firing; GMB.
2. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
3. Navdatoli; chalcolithic; red ware; post-firing; DCP.

(xxii) *Symbol 23* (pl. XVII B)

The symbol consists of a loop in the middle of which is a vertical stroke.

The particulars of the illustrated examples are as follows.

1. Provenance indefinite; megalithic; red ware; pre-firing; GMB.
2. Mohenjo-daro; Harappan; seal.[2]

(xxiii) *Symbol 24* (pl. XVIII)

The symbol consists of a set of three vertical lines usually meeting at one end. To this is added a zig-zag on each side. The final look of the symbol is dependent on the disposal of the zig-zags. Thus, an effect of a series of triangles is produced when the zig-zags touch the outer lines (for example, nos. 5, 6 and 7). Sometimes, the zig-zags may cut the outer lines (for example, no. 4). In a rather rare case there is only one zig-zag, cutting across all the three lines (no. 3).

The particulars of the illustrated examples are as follows.

1. District Coimbatore; megalithic; red ware; post-firing; GMM.
2. District North Arcot; megalithic; Russet-coated Painted Ware; post-firing; GMM.

[1] John Marshall, *Mohenjo-daro and the Indus Civilization*, III (London, 1931), pl. CXI, *343*.
[2] Mackay, *op. cit.*, pl. LXXXVI, *184*.

3. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
4. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
5. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.
6. Navdatoli; chalcolithic; red ware; post-firing; DCP.
7. Rangpur; chalcolithic; red ware; post-firing; PWMB.

(xxiv) *Symbol 25* (pl. XIX)

The symbol consists of a zig-zag, often with sharp angles. It is usually placed horizontally, but may sometimes be vertical.

The particulars of the illustrated examples, are as follows.

1. District South Arcot, Madras; megalithic; red ware; post-firing; GMM.
2. Mohenjo-daro; Harappan; seal.[1]
3. T. Narasipur; megalithic; red ware; post-firing; DAM.
4. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
5. Korat; chalcolithic; black-and-red ware; post-firing; ASI.

(xxv) *Symbol 26* (pl. XX A)

The symbol consists of a circle, which is sometimes repeated, may be as a variant or, more likely, a duplicate.

The particulars of the illustrated examples are as follows.

1. Provenance indefinite; megalithic; red ware; post-firing; HMH.
2. Navdatoli; chalcolithic; red ware; post-firing; DCP.

(xxvi) *Symbol 27* (pl. XX B)

The symbol consists of two circles joined by a horizontal line.

The particulars of the illustrated examples are as follows.

1. Provenance indefinite; megalithic; black ware; post-firing; HMH.
2. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.

(xxvii) *Symbol 28* (pl. XXI A)

The symbol consists of a circle cut by a vertical line. It roughly resembles the Greek alphabet Φ.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; red ware; post-firing; DAM.
2. Lothal; Harappan; seal; ASI.

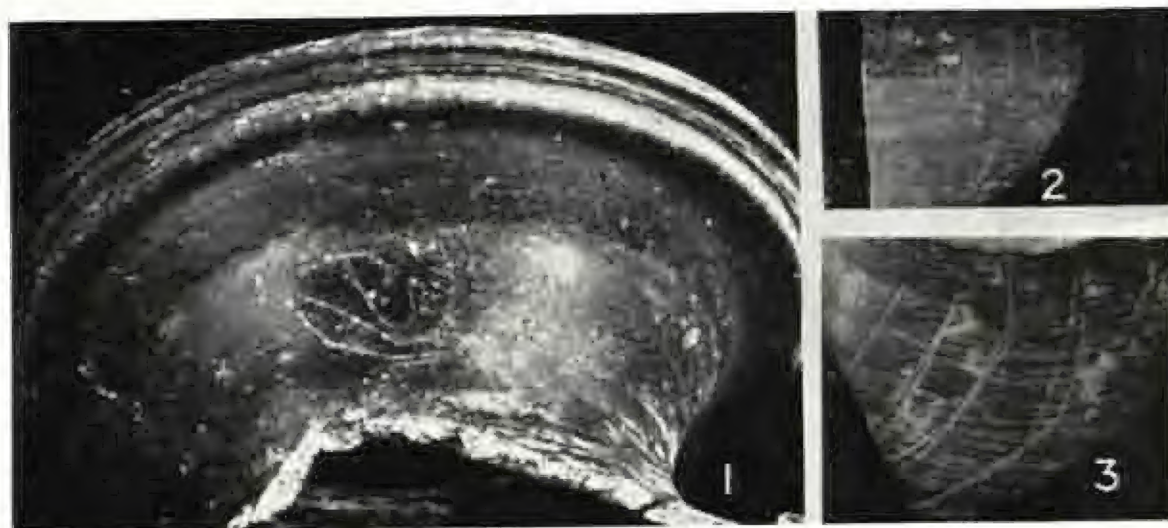
(xxviii) *Symbol 29* (pl. XXI B)

The symbol consists of a circle cut by a vertical and a horizontal line.

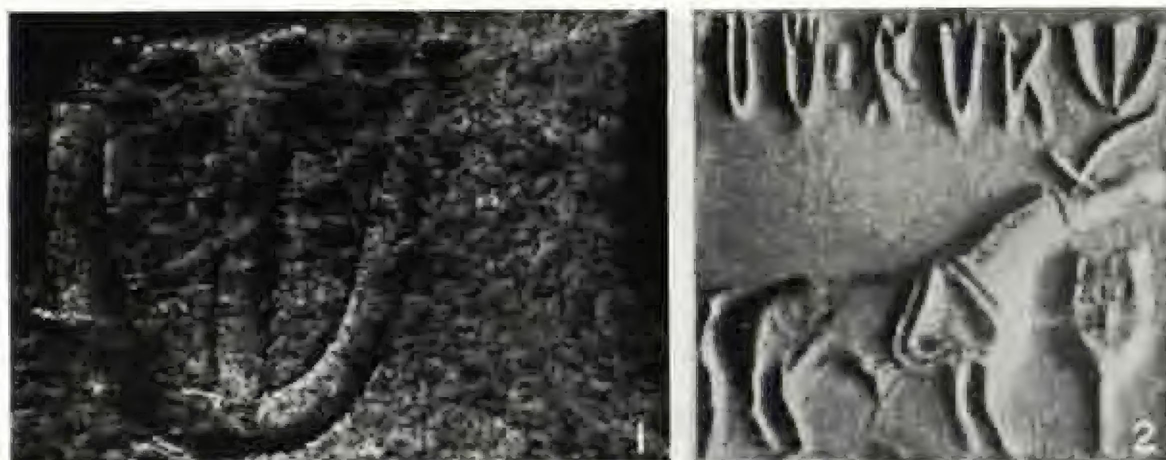
The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; red ware; post-firing; DAM.

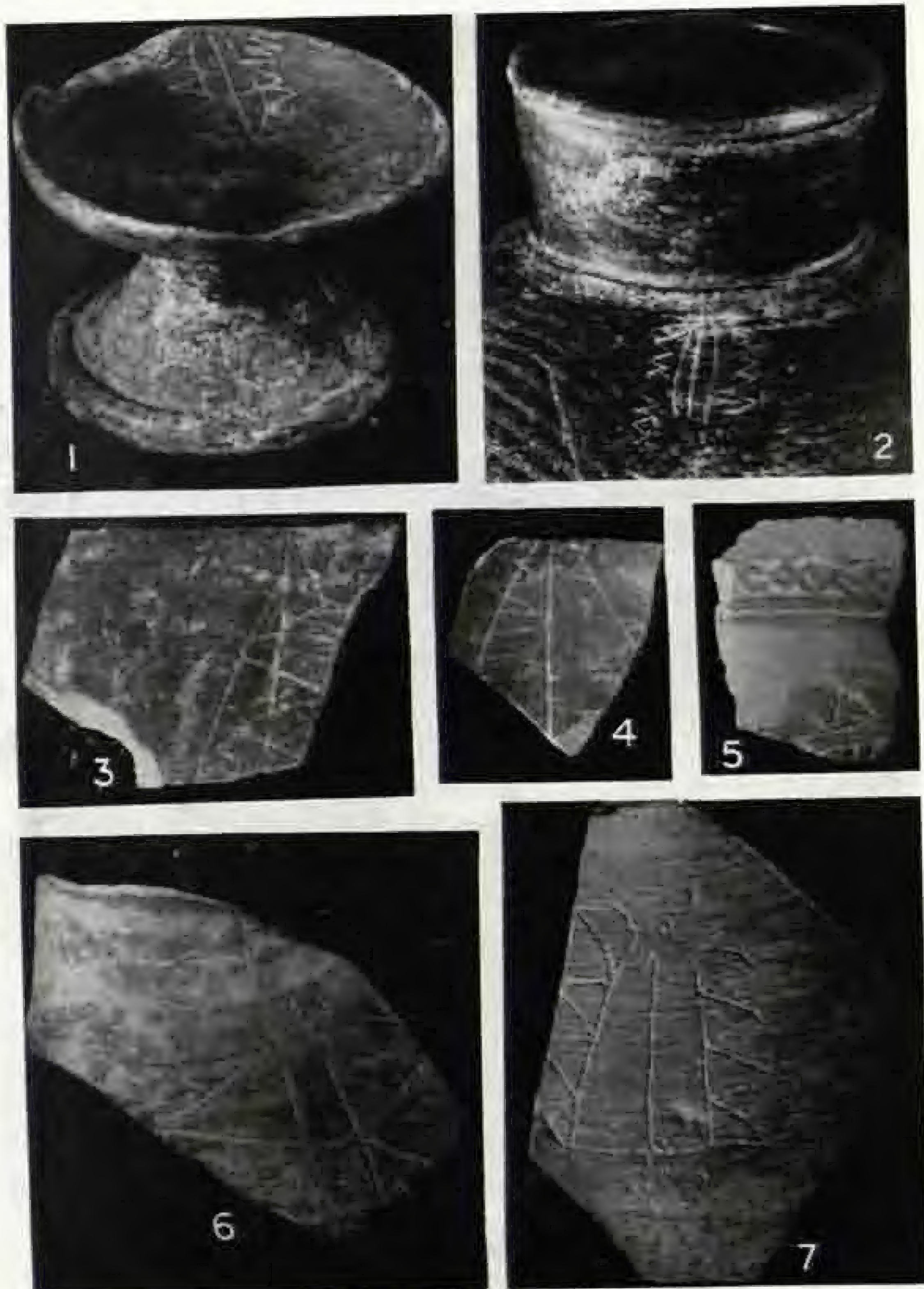
[1] Marshall, *op. cit.*, pl. CVI, *102*.



A. *Symbols 21 and 22: 1 and 2, megalithic; and 3, chalcolithic. Scale: [illegible].* *See p. 13*

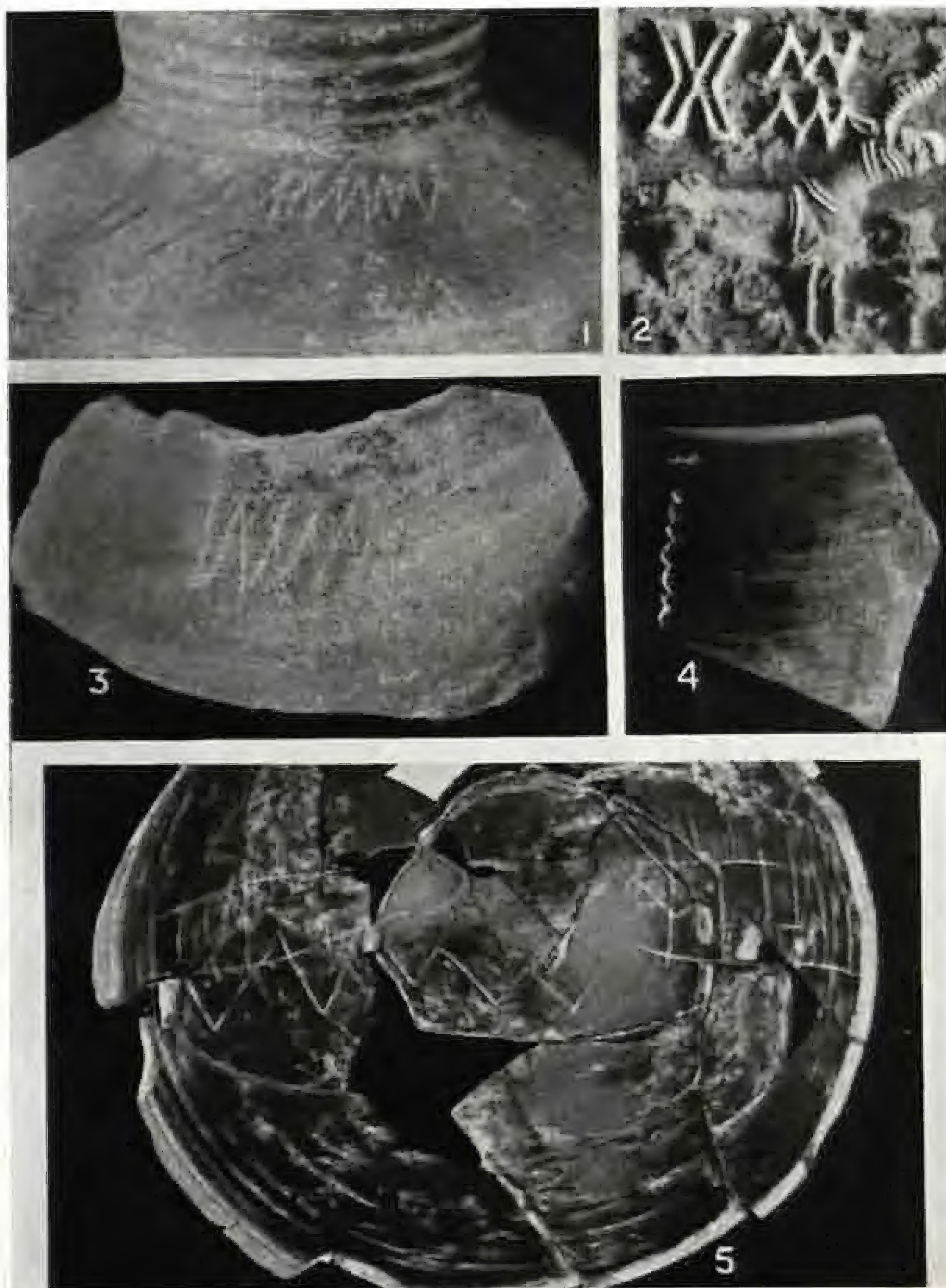


B. *Symbol 23: 1, megalithic; and 2, Harappan. Scale: 1, [illegible]; and 2, [illegible].* *See p. 13*



Symbol 24: 1-4, megalithic; and 5-7, chalcolithic. Scale: ⅗. See p. 13

To face pl. XIX

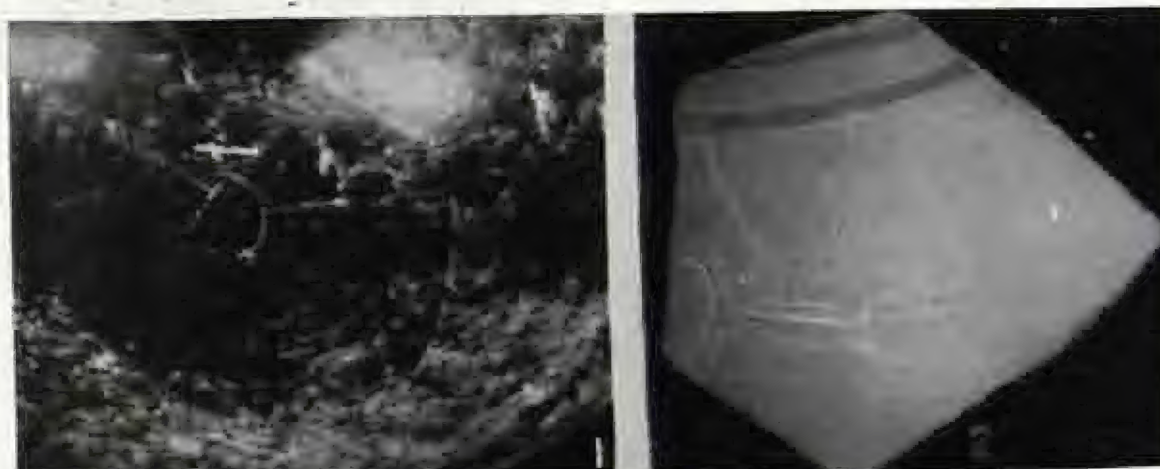


Symbol 25: 1 and 3, megalithic; 2, Harappan; and 4 and 5, chalcolithic. Scale: 2, $\frac{3}{1}$; and rest, $\frac{7}{8}$. *See p. 14*

To face pl. XVIII



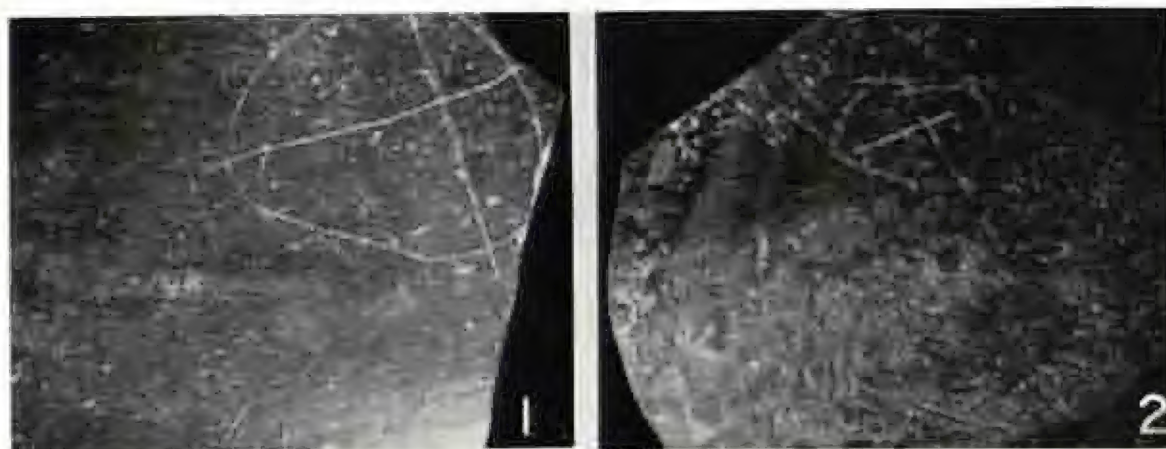
A. *Symbol 26: 1, megalithic; and 2, chalcolithic. Scale: 1,* [illegible]*; and 2, not to scale.* *See p. 14*

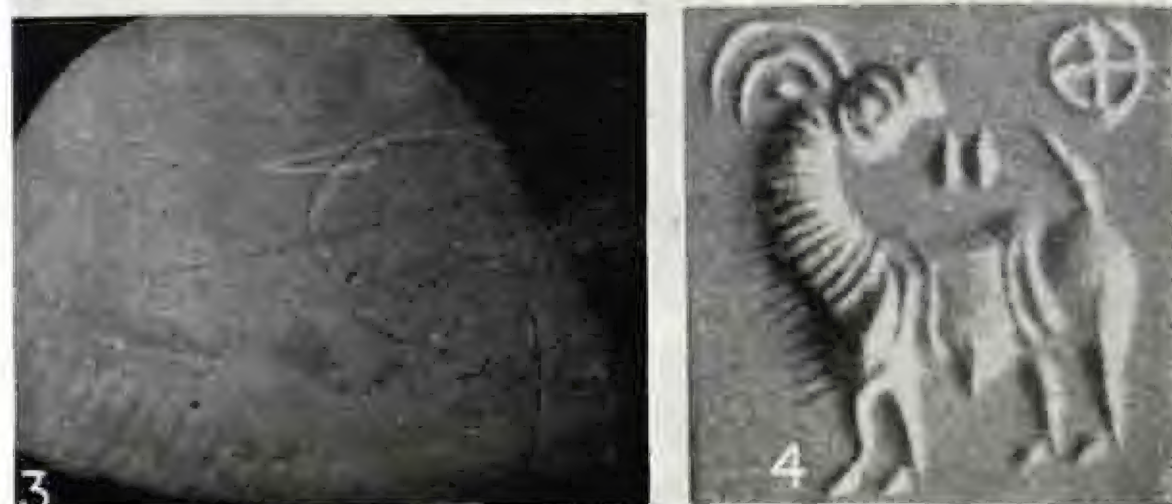


B. *Symbol 27: 1, megalithic; and 2, chalcolithic. Scale:* [illegible]. *See p. 14*



A. *Symbol 28: 1, megalithic; and 2, Harappan. Scale: 1, $\frac{1}{2}$; and 2, not to scale.* *See p. 14*





B. *Symbol 29: 1, megalithic; 2 and 4, Harappan; and 3, chalcolithic. Scale: 4, $\frac{2}{1}$; and rest, $\frac{1}{1}$.* *See p. 14*

To face pl. XX

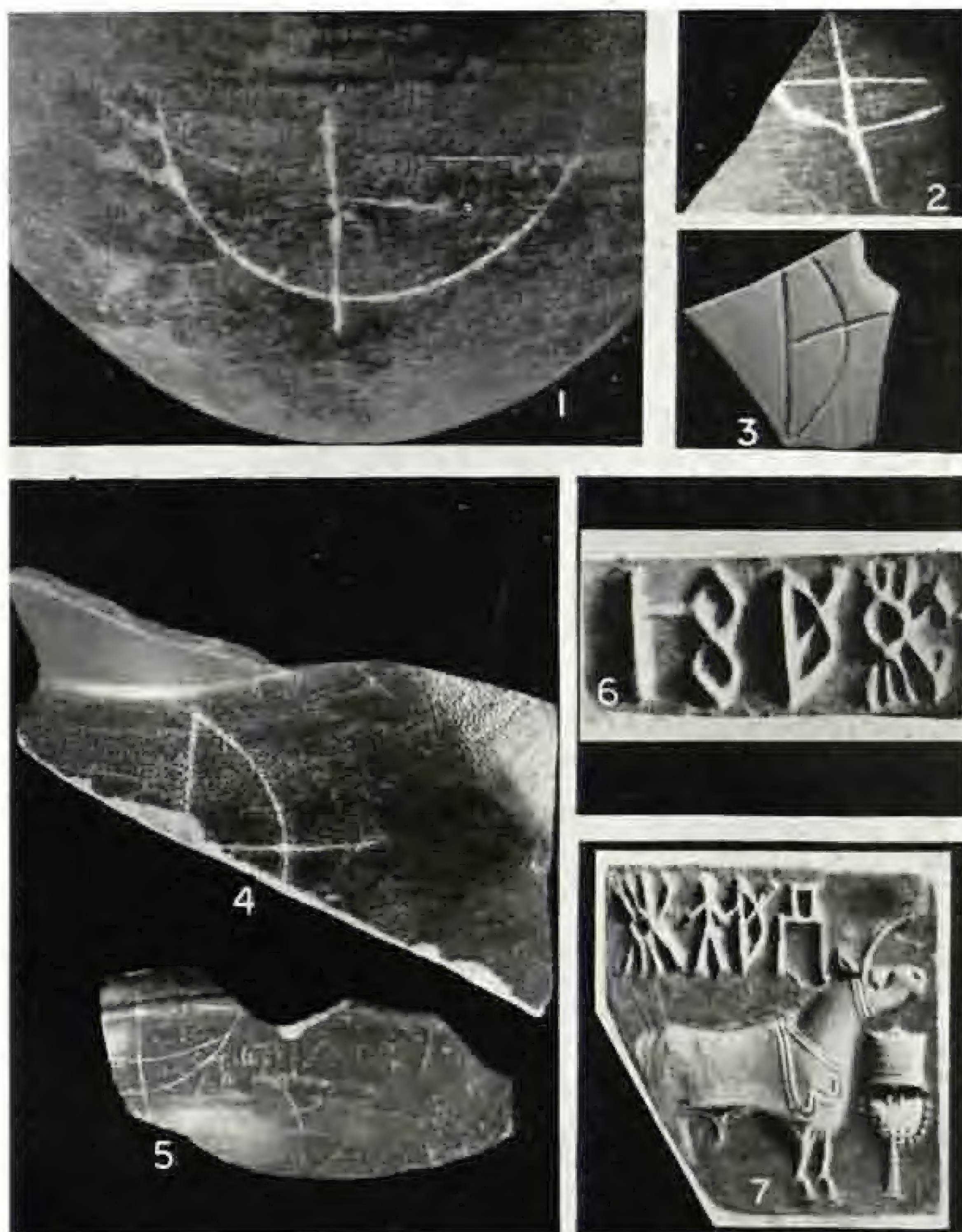


A. *Symbols 30: 1 and 2, megalithic; and 3, Harappan. Scale: ⅔.* *See p. 15*



B. *Symbol 31: 1, megalithic; and 2, Harappan. Scale: 1, ⅔; and 2, ⅘.* *See p. 15*

To face pl. XXIII

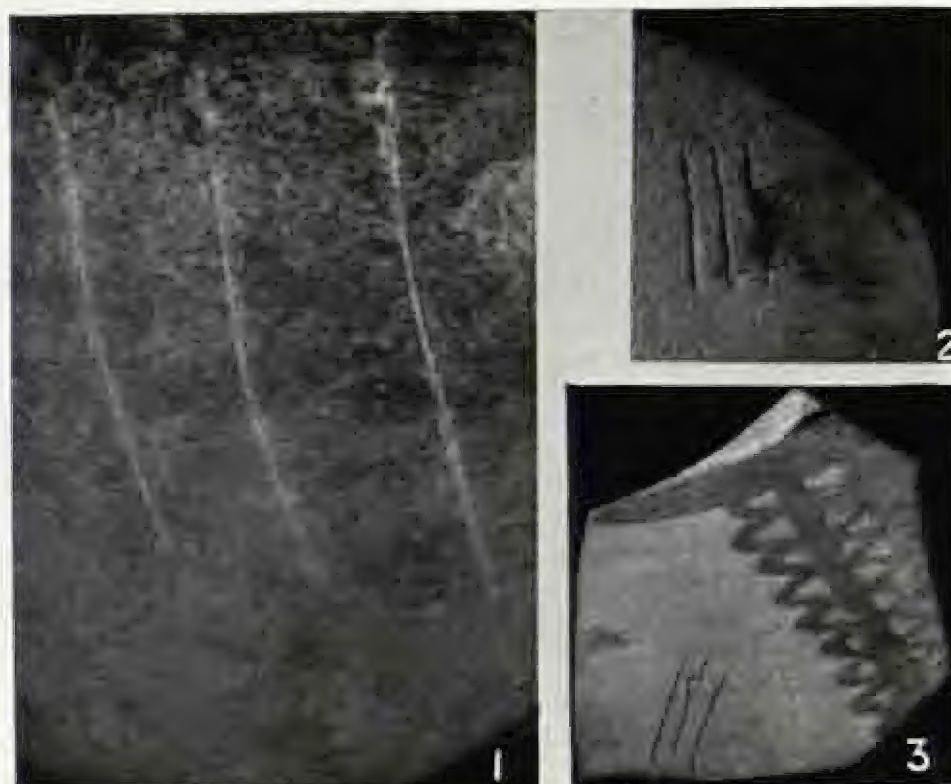


Symbol 32: 1, 4 and 5, megalithic; 2, chalcolithic; and 3, 6 and 7, Harappan. Scale: 1-5, $\frac{2}{3}$; 6, $\frac{3}{1}$; and 7, $\frac{1}{1}$. *See p. 15*

To face pl. XXII



A. *Symbol 33: 1, megalithic; and 2, chalcolithic. Scale:* $\frac{2}{3}$. *See p. 15*



B. *Symbol 34: 1, megalithic; 2, Harappan; and 3, chalcolithic. Scale:* $\frac{2}{3}$. *See p. 16*

To face p. 15

2. Lothal; late Harappan (Lothal B); coarse red ware; post-firing; ASI.
3. Navdatoli; chalcolithic; black-on-red ware; post-firing DCP.
4. Mohenjo-daro; Harappan; seal.[1]

(xxix) *Symbol 30* (pl. XXII A)

The symbol may vaguely be described as resembling the Greek letter α.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
2. T. Narasipur; megalithic; red ware; post-firing; DAM.
3. Kalibangan; Harappan; red ware; pre-firing; ASI.

(xxx) *Symbol 31* (pl. XXII B)

The symbol consists of a vertical line whose ends are joined with each other by an arc. It may be said to resemble the English letter D.

The particulars of the illustrated examples are as follows.

1. Maski; megalithic; Black-and-red Ware; post-firing; ASI.
2. Harappa; Harappan; seal.[2]

(xxxi) *Symbol 32* (pl. XXIII)

The symbol consists of a line (rarely two lines) whose ends are joined with each other by an arc. Cutting the arc and the line, but sometimes stopping at the latter, is another line. The symbol is mostly placed vertically so as to resemble a bow and an arrow (for example, nos. 3, 4, 6 and 7), but is also met with in a horizontal position.

The particulars of the illustrated examples are as follows.

1. Provenance indefinite; megalithic; red ware; pre-firing; HMH.
2. Rangpur; chalcolithic (Rangpur II C); red ware; post-firing; ASI.
3. Kalibangan; Harappan; red ware; pre-firing; ASI.
4. T. Narasipur; megalithic; red ware; post-firing; DAM.
5. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
6. Harappa; Harappan; seal.[3]
7. Mohenjo-daro; Harappan; seal.[4]

(xxxii) *Symbol 33* (pl. XXIV A)

The symbol consists of two parallel vertical lines.

The particulars of the illustrated examples are as follows.

1. Provenance indefinite; megalithic; red ware; pre-firing; HMH.
2. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.

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[1] Mackay, *op. cit.*, pl. XCVII, *554*.
[2] Vats, *op. cit.*, pl. LXXXV, *6*.
[3] *Ibid.*, pl. XCII, *280*.
[4] Marshall, *op. cit.*, pl. CII, *15*.

(xxxiii) *Symbol 34* (pl. XXIV B)

The symbol consists of three parallel vertical (rarely oblique) lines.

The particulars of the illustrated examples are as follows.

1. Provenance indefinite; megalithic; red ware; pre-firing; HMH.
2. Kalibangan; Harappan; red ware; post-firing; ASI.
3. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.

(xxxiv) *Symbol 35* (XXV A)

The symbol consists of four parallel vertical lines.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; red ware; post-firing; DAM.
2. Rangpur; chalcolithic; Lustrous Red Ware; post-firing; PWMB.
3. Navdatoli; chalcolithic; red ware; post-firing; DCP.

(xxxv) *Symbol 36* (pl. XXV B)

The symbol consists of five parallel vertical lines.

The particulars of the illustrated examples are as follows.

1. District Madurai; megalithic; Black-and-red Ware; post-firing; GMM.
2. Mohenjo-daro; Harappan; seal.[1]

(xxxvi) *Symbols 37-39* (pl. XXVI)

The symbols consist respectively of two, three or more parallel lines cut by a transverse line.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; red ware; post-firing; DAM.
2. Maski; megalithic; Black-and-red Ware; post-firing; ASI.
3. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI.
4. Harappa; Harappan; red ware; pre-firing; ASI.
5. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
6. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
7. Mohenjo-daro; Harappan; seal.[2]

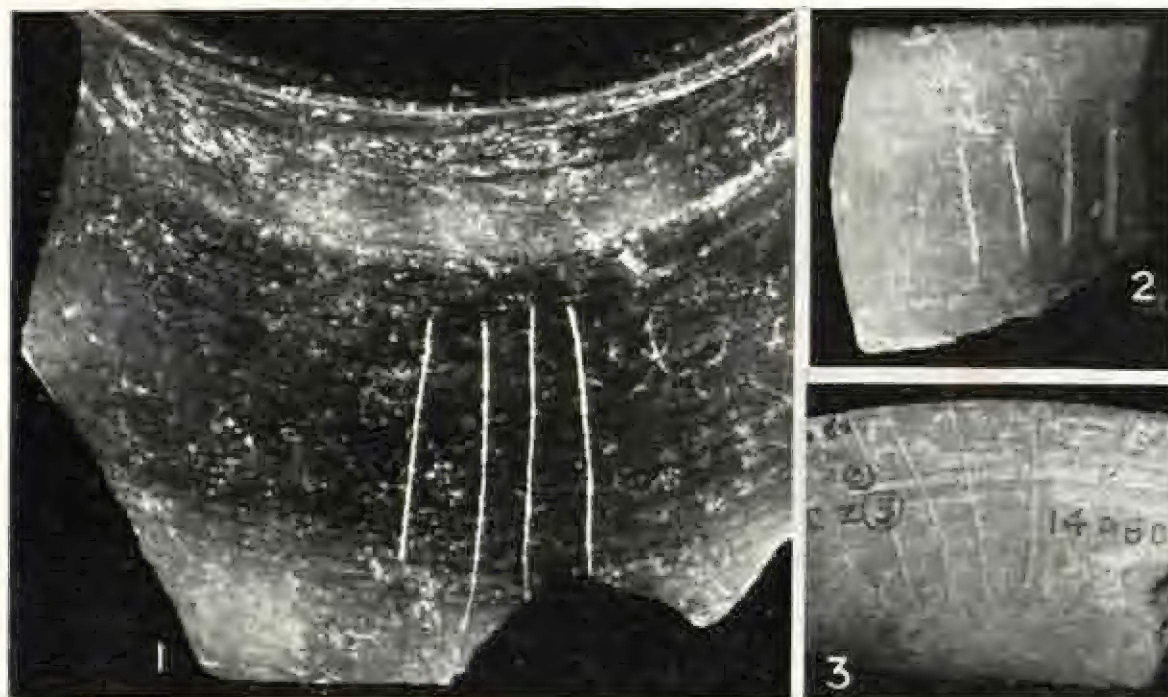
(xxxvii) *Symbol 40* (pl. XXVII)

The symbol consists of three or more horizontal lines cutting three or more vertical lines, thus producing a criss-cross pattern.

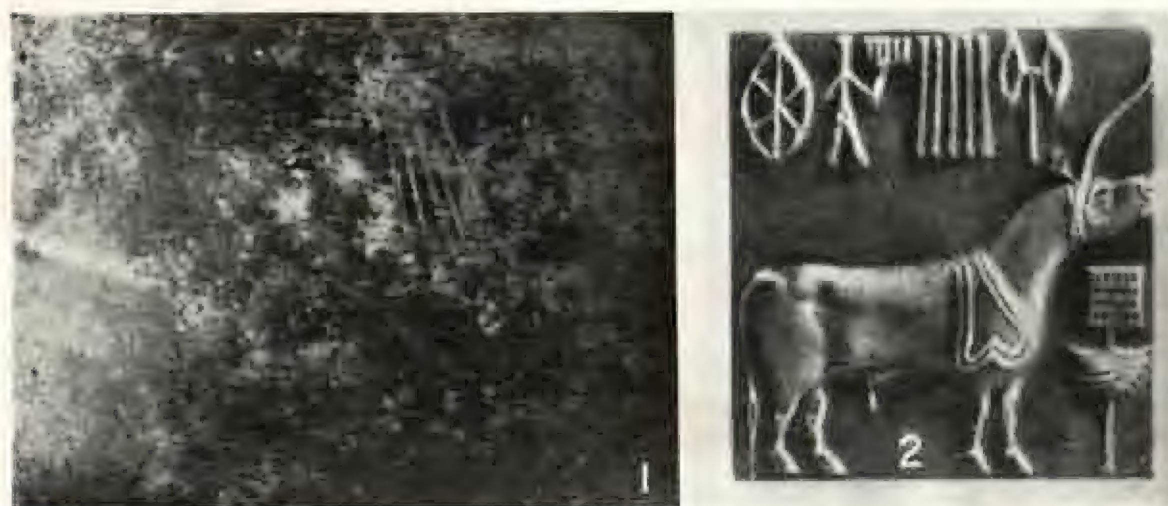
The particulars of the illustrated examples are as follows.

1. Chikkajala; megalithic; red ware; post-firing; GMB.
2. Rangpur; chalcolithic; dull-red ware; pre-firing; PWMB.

[1] Marshall, *op. cit.*, pl. CIV, *37*.
[2] *Ibid.*, pl. CIX, *219*.

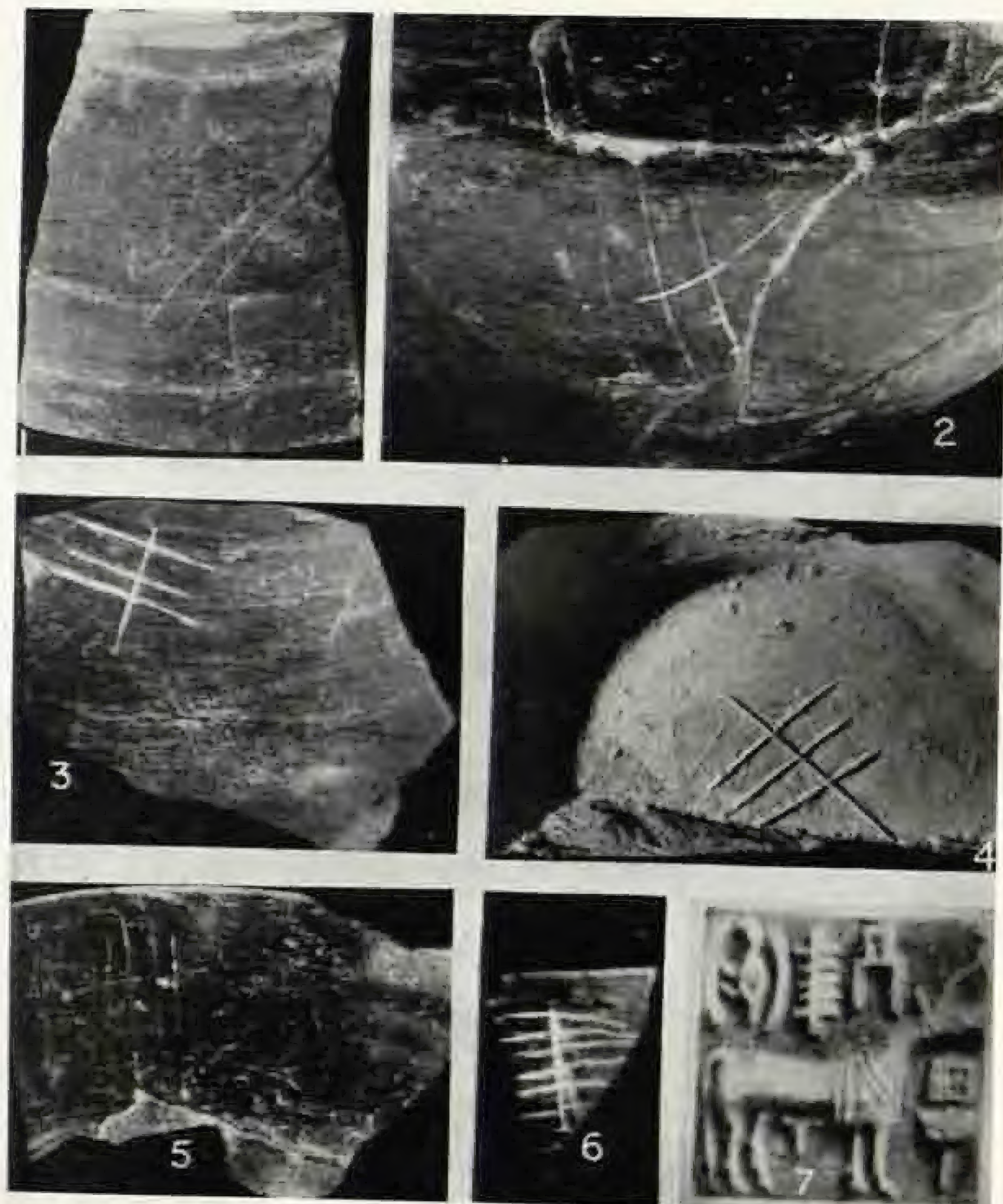


A. *Symbol 35: 1, megalithic; and 2 and 3, chalcolithic. Scale:* $\frac{2}{3}$. *See p. 16*



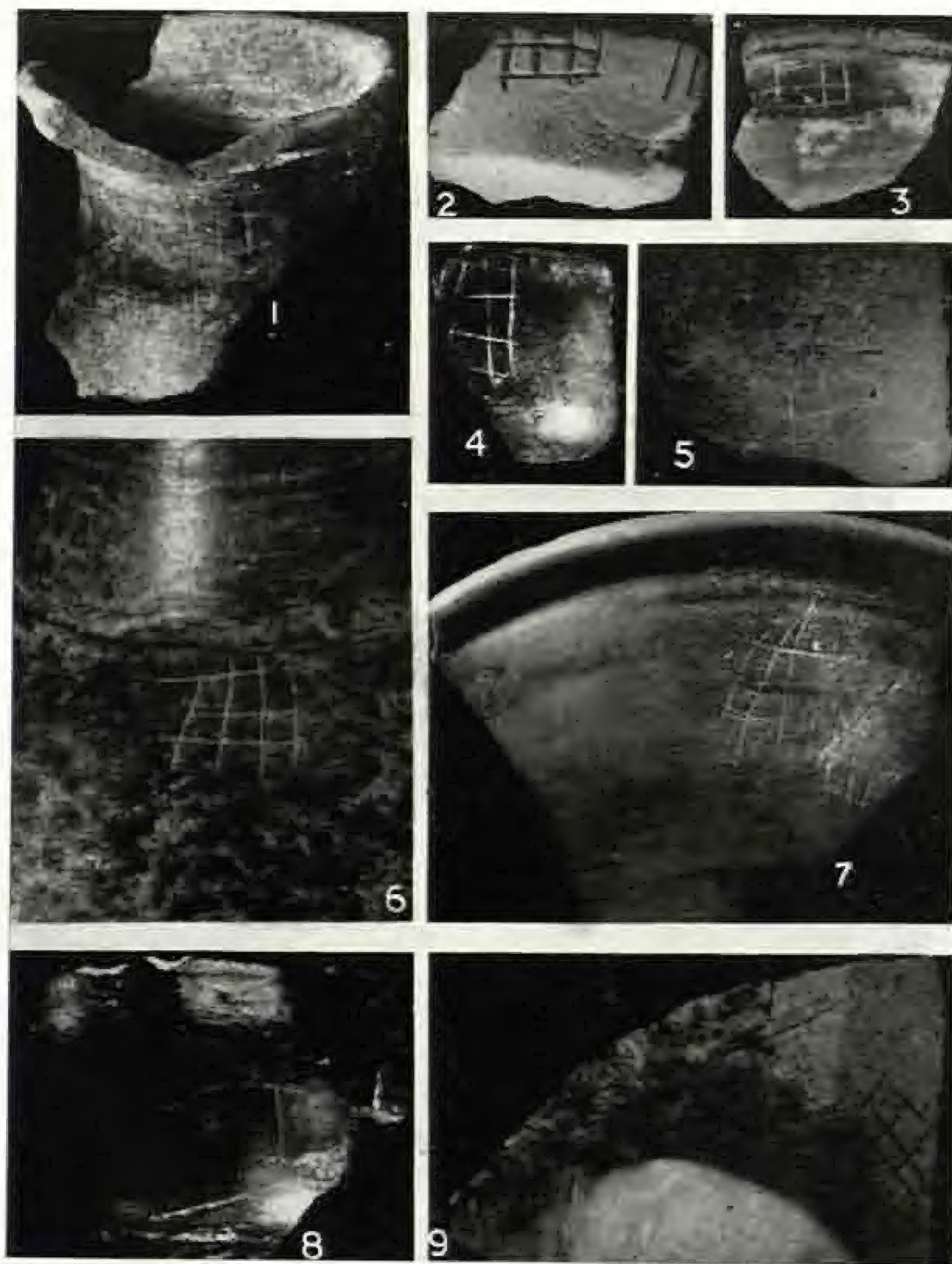
B. *Symbol 36: 1, megalithic; and 2, Harappan. Scale: 1,* $\frac{2}{3}$*; and 2,* $\frac{3}{4}$. *See p. 16*

To face p. 16



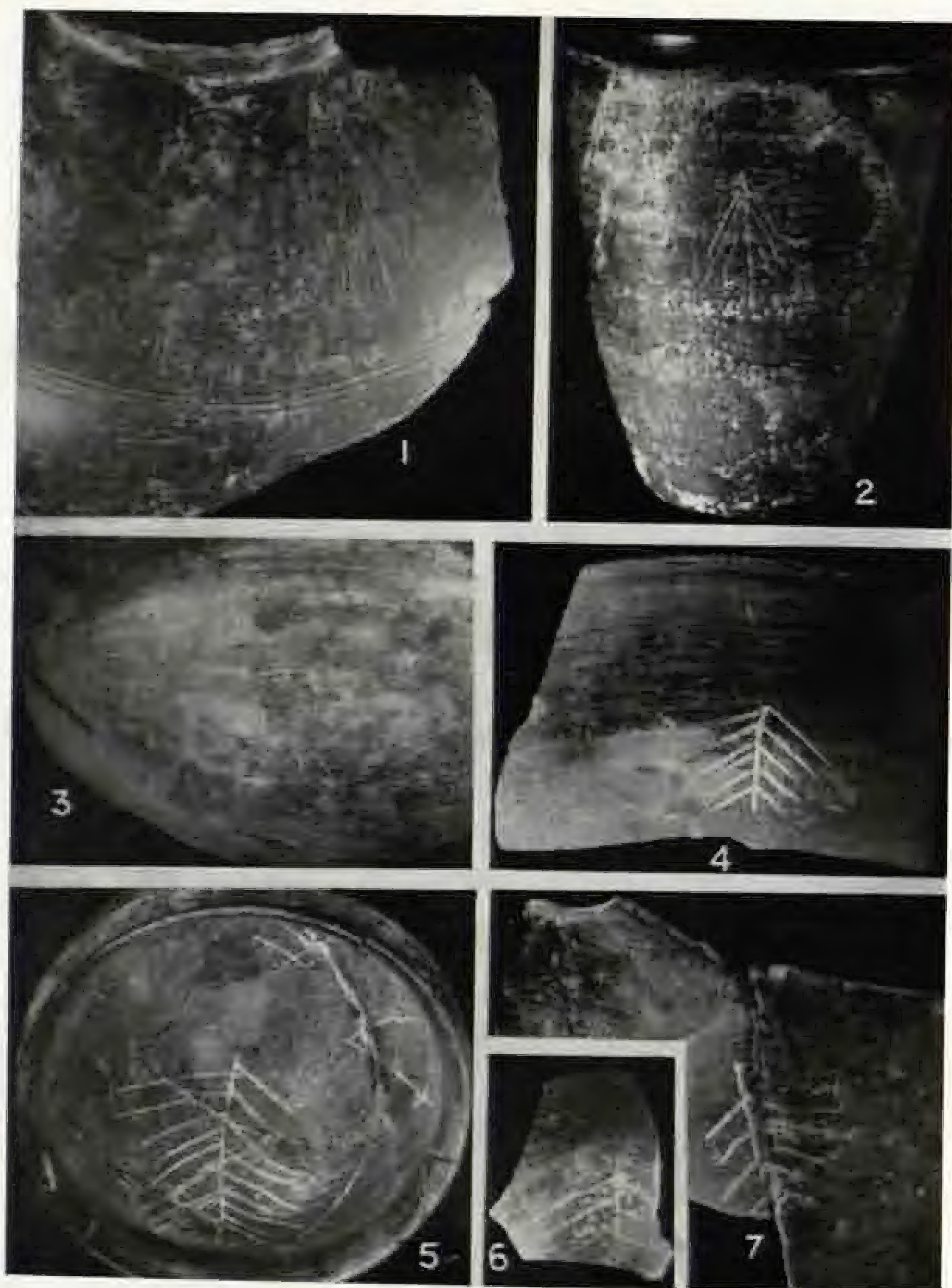
Symbol 37-39: 1, 2 and 5, megalithic; 3 and 6, chalcolithic; and 4 and 7, Harappan. Scale: 7, $\frac{2}{1}$; and rest, $\frac{4}{5}$. See p. 16

To face pl. XXVII



Symbol 40: 1, 3, 4, 6 and 8, megalithic; 2 and 5, chalcolithic; and 7 and 9, Harrappan. Scale: $\frac{2}{3}$. *See p. 16*

To face pl. XXVI



Symbol 41: 1-3 and 6, megalithic; 4 and 5, chalcolithic; and 7, Harappan. Scale : ⅔. See p. 17

To face pl. XXIX

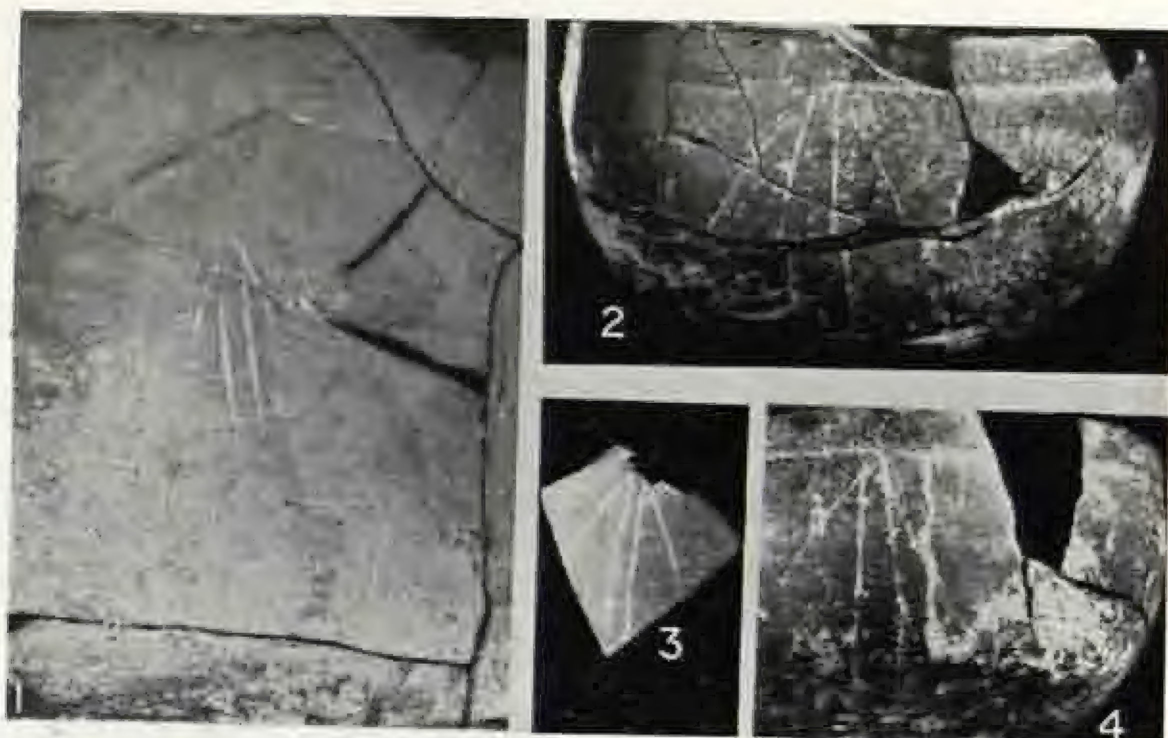


A. *Symbol 42: 1, megalithic; and 2, Harappan. Scale* $\frac{2}{3}$. *See p. 17*



B. *Symbol 43: 1, Megalithic; and 2, chalcolithic. Scale:* $\frac{4}{5}$. *See p. 17*

To face pl. XXVIII

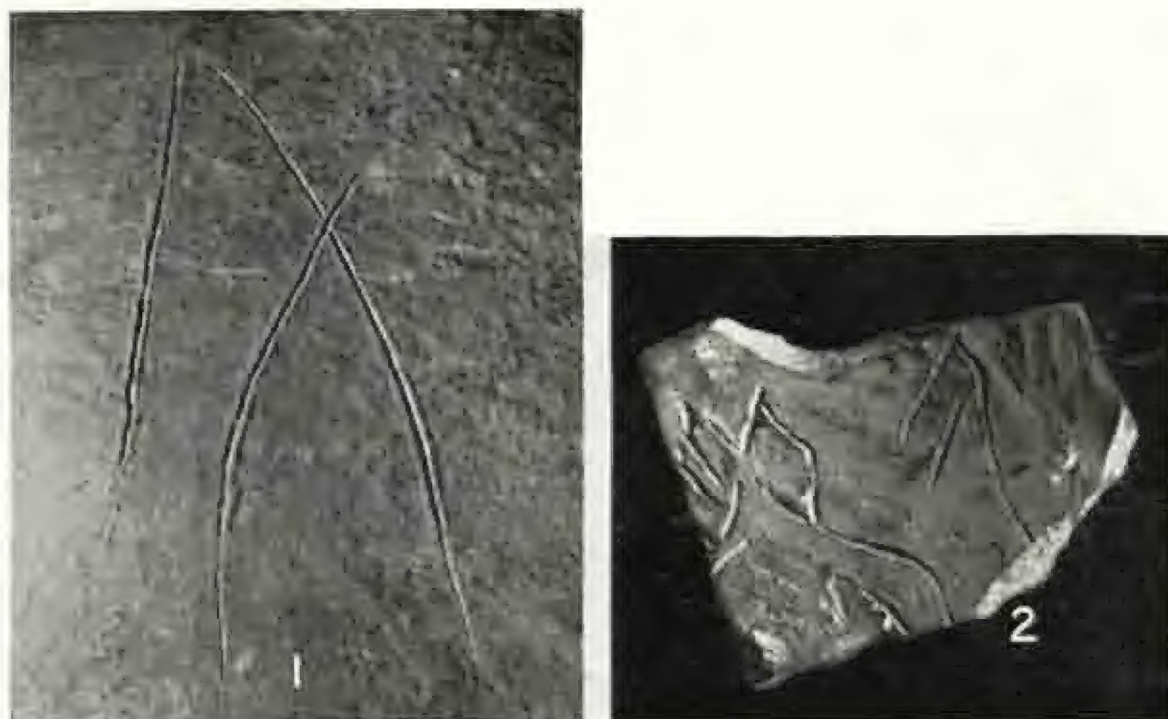


A. *Symbol 44: 1 and 3, chalcolithic; and 2 and 4, megalithic. Scale:* $\frac{2}{3}$. *See p. 17*

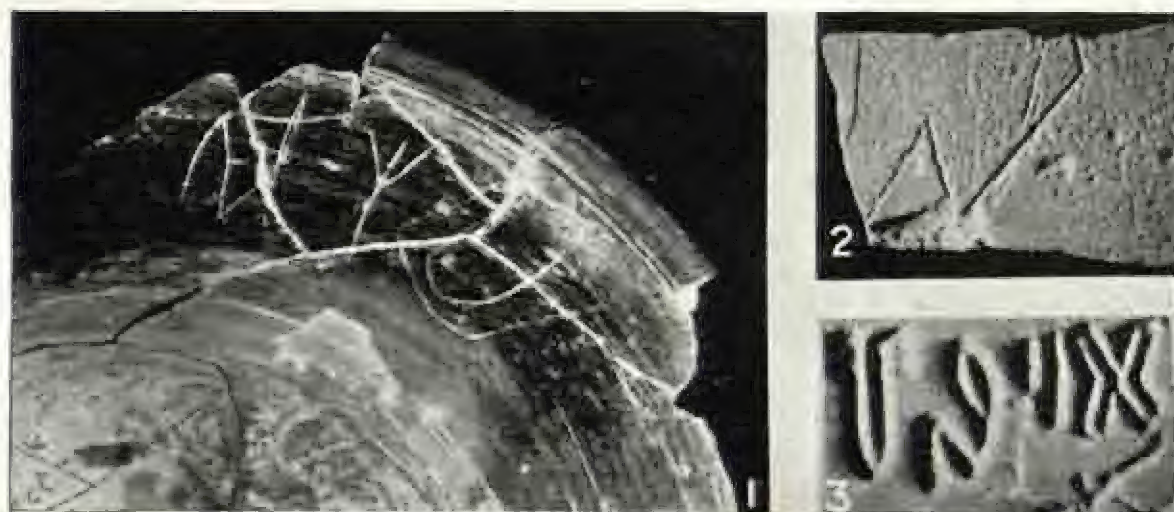


B. *Symbol 45: 1, megalithic; and 2 and 3, Harappan. Scale: 1 and 2,* $\frac{3}{4}$*; and 3,* $\frac{4}{1}$. *See p. 18*

To face pl. XXXI



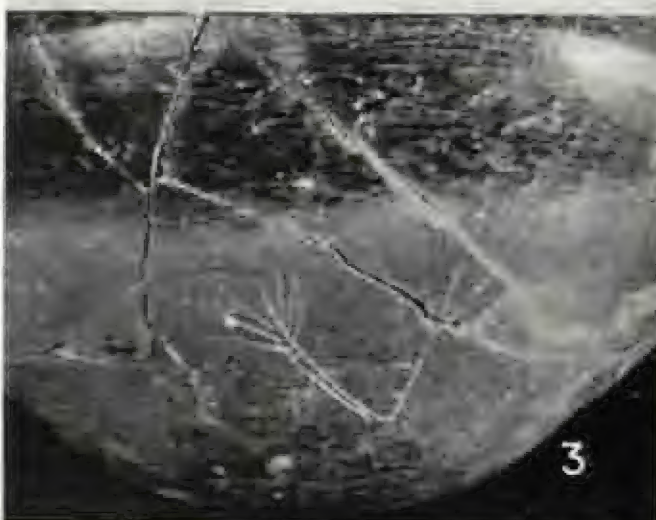
A. *Symbol 46: 1, megalithic; and 2, Harappan. Scale: $\frac{2}{3}$. See p. 18*



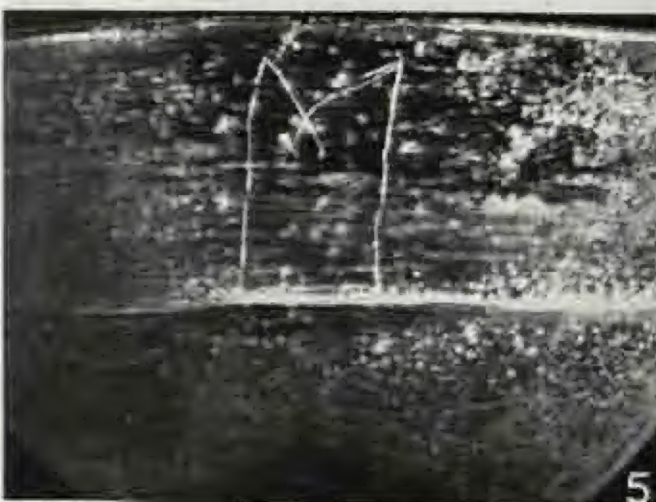
B. *Symbol 47: 1, megalithic; and 2 and 3, Harappan. Scale: 1 and 2, $\frac{3}{4}$; and 3, $\frac{4}{1}$. See p. 18*







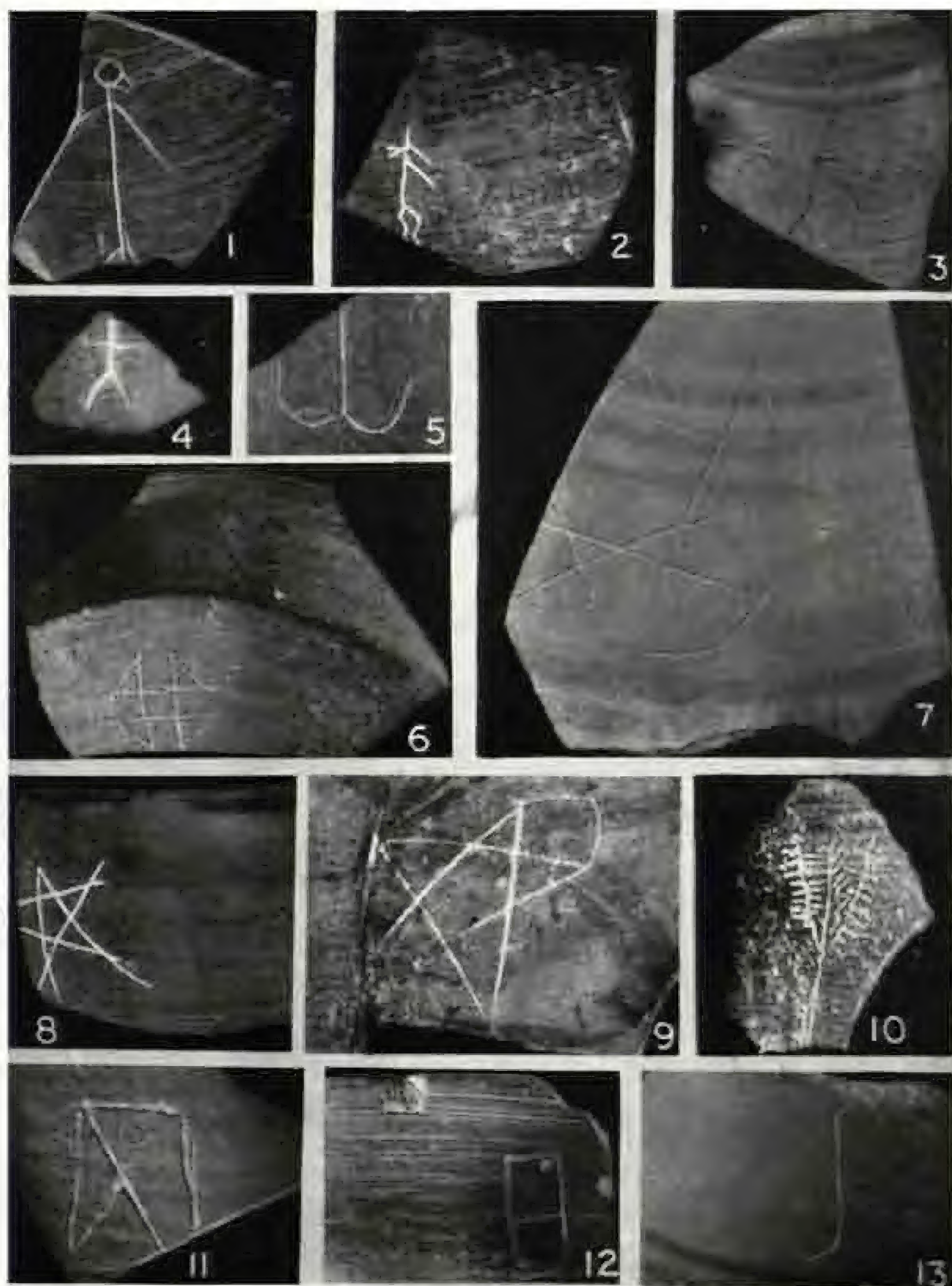






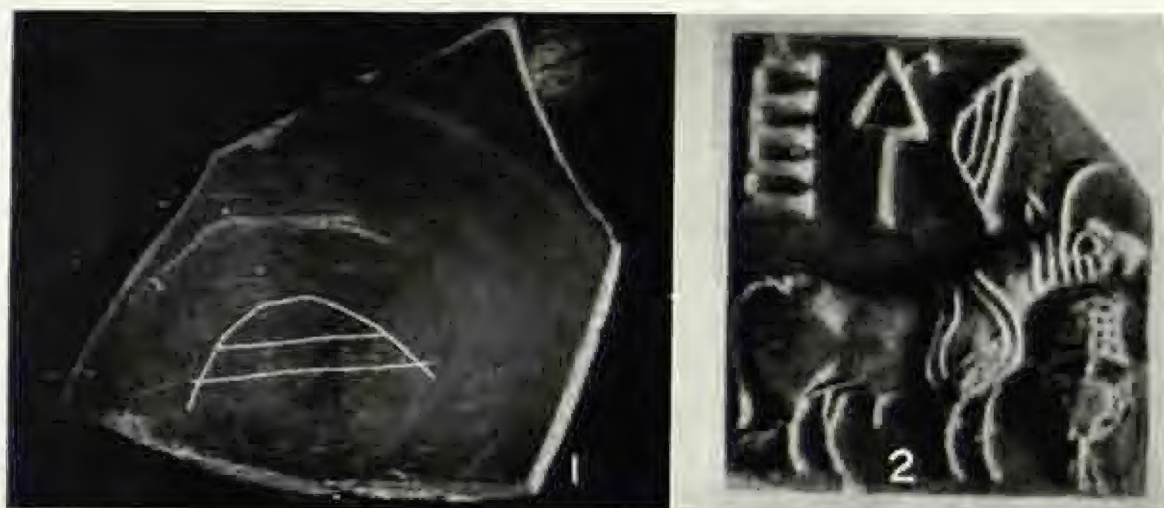
Symbols 48-53: exclusively megalithic. Scale: $\frac{2}{3}$. See pp. 18-19

To face pl. XXXIII

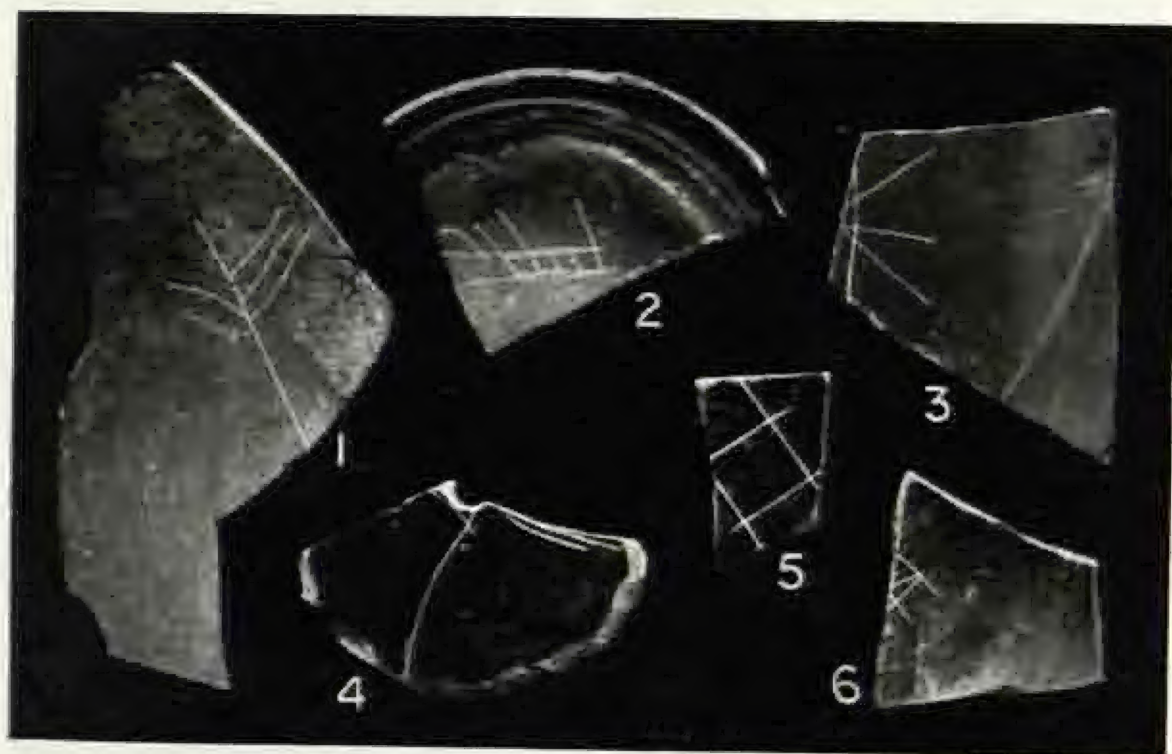


Symbols 54-61: exclusively chalcolithic. Scale: ¾. See pp. 19-21

To face pl. XXXII



A. *1, black-and-red ware, Sonpur; and 2, seal, Mohenjo-daro. Scale: 1, $\frac{3}{4}$; and 2, $\frac{1}{1}$.* *See p. 23*



B. *Symbols on pottery from Sonpur: 1-3 and 6, grey ware; and 4 and 5, N.B.P. Ware. Scale: $\frac{3}{4}$.* *See p. 23*

3. Provenance indefinite; megalithic; Black-and-red Ware; post-firing; GMM.
4. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
5. Navdatoli; chalcolithic; red ware; post-firing; DCP.
6. Chikkajala; megalithic; red ware; post-firing; GMB.
7. Kalibangan; Harappan; buffish grey ware; post-firing; ASI.
8. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
9. Harappa; Harappan; post-firing.[1]

(xxxviii) *Symbol 41* (pl. XXVIII)

The symbol consists of a vertical line joining which on each side is a series of oblique strokes. The symbol may be said to resemble a stylized coniferous tree.

The particulars of the illustrated examples are as follows.

1. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
2. Tozhupedu (Perumbair); megalithic; Black-and-red Ware; post-firing; GMM.
3. District North Arcot; megalithic; Black-and-red Ware; post-firing; GMM.
4. Rangpur; chalcolithic (Rangpur III); Lustrous Red Ware; post-firing; ASI.
5. Tekwada; chalcolithic; black-and-red ware; post-firing; ASI.
6. T. Narasipur; megalithic; Black-and-red Ware; post-firing; DAM.
7. Lothal; late Harappan (Lothal B); red ware; post-firing; ASI.

(xxxix) *Symbol 42* (pl. XXIX A)

The symbol consists of a vertical line which is joined on each side by two oblique lines sloping towards it.

The particulars of the illustrated examples are as follows.

1. Jadigenahalli; megalithic; Black-and-red Ware; post-firing; DAM.
2. Rangpur; late Harappan (Rangpur II B); coarse red ware; post-firing; ASI.

(xl) *Symbol 43* (pl. XXIX B)

The symbol consists of a vertical line cutting a horizontal line. At each end is added a small circle. The symbol reminds one of the ' Ujjain ' symbol known from early Indian coins.

The particulars of the illustrated examples are as follows.

1. Tozhupedu (Perumbair); megalithic: Black-and-red Ware; post-firing; GMM.
2. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.

(xli) *Symbol 44* (pl. XXX A)

The symbol consists of two parallel vertical lines from the upper ends of each of which is drawn on the outer side an oblique line sloping downwards.

The particulars of the illustrated examples are as follows.

1. Tekwada; chalcolithic; black-and-red ware; post-firing; ASI.
2. Chandravalli; megalithic; Black-and-red Ware; post-firing; GMB.

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[1] Vats, *op. cit.*, pl. CIV, *64*.

3. Rangpur; chalcolithic (Rangpur II C); coarse red ware; post-firing; ASI.
4. Chandravalli; megalithic; Black-and-red Ware; post-firing; GMB.

(xlii) *Symbol 45* (pl. XXX B)

The symbol may be said to resemble the English letter W.

The particulars of the illustrated examples are as follows.

1. Sanur; megalithic; red ware; post-firing; ASI.
2. Kalibangan; Harappan; red ware; pre-firing; ASI.
3. Harappa; Harappan; seal.[1]

(xliii) *Symbol 46* (pl. XXX A)

The symbol consists of two oblique lines meeting each other at their upper ends. Between these two lines is another oblique line which just touches or slightly cuts across the right-side line. The symbol vaguely resembles the Brāhmī letter *śa*.

The particulars of the illustrated examples are as follows.

1. Maski; megalithic; red ware; pre-firing; ASI.
2. Lothal; Harappan (Lothal A); red ware; pre-firing; ASI.

(xliv) *Symbol 47* (pl. XXXI B)

The symbol may vaguely be described as resembling the English letter 'I' in its script form. To the lower end is added an oblique stroke.

The particulars of the illustrated examples are as follows.

1. Sanur; megalithic; Black-and-red Ware; post-firing; ASI.
2. Kalibangan; Harappan; red ware; post-firing; ASI.
3. Harappa; Harappan; seal.[2]

B. Symbols exclusive to the megalithic pottery

As already stated (p. 5), the present study is in a midway. Thus, it is not possible to say categorically whether a particular symbol occurring on the megalithic pottery is absent from the chalcolithic or *vice versa*. However, the impression gained so far tends to indicate that the following megalithic symbols do not occur on earlier pottery.

(i) *Symbol 48* (pl. XXXII, *1*)

The symbol is formed by two intersecting oblique lines, the upper and lower ends respectively being joined by horizontal strokes. The two triangles thus formed are further subdivided by horizontal strokes the number of which may vary from one to seven (examples not illustrated). On either side of the crossing of the oblique lines is a pair of vertical strokes.

The particulars of the illustrated example are: District North Arcot; megalithic; Black-and-red Ware; post-firing; GMM.

[1] Vats, *op. cit.*, pl. LXXXVI, *37*.
[2] *Ibid.*, pl. LXXXIX, *110*.

(ii) *Symbol 49* (pl. XXXII, *2*)

The symbol consists of a vertical line which is joined, usually at a point, by slightly curved lines on either side, the number of which may vary from one to three.

The particulars of the illustrated example are: District Coimbatore; megalithic; Russet-coated Painted Ware; post-firing; GMM.

(iii) *Symbol 50* (pl. XXXII, *3*)

The symbol consists of two oblique lines meeting at their lower ends. The upper parts of these lines are joined by three pairs of oblique strokes.

The particulars of the illustrated example are: Maski; megalithic; Black-and-red Ware; post-firing; ASI.

(iv) *Symbol 51* (pl. XXXII, *4*)

The symbol consists of two intersecting oblique lines, the lower ends of which are joined by a horizontal line. It roughly resembles the Brāhmī letter *ma*.

The particulars of the illustrated example are: Provenance indefinite; megalithic; red ware; post-firing; HMH.

(v) *Symbol 52* (pl. XXXII, *5*)

The symbol consists of two vertical lines, from the upper end of each of which is drawn, inwards, a comparatively small oblique line cutting its counterpart. The complex roughly resembles the English capital letter M.

The particulars of the illustrated example are: Savandrug; megalithic; Black-and-red Ware; post-firing; GMB.

(vi) *Symbol 53* (pl. XXXII, *6*)

An indeterminate but complex symbol.

The particulars of the illustrated example are: Maski; megalithic; red ware; post-firing; ASI.

C. Symbols exclusive to the post-Harappan chalcolithic pottery

The following symbols, common on the post-Harappan chalcolithic pottery, have not so far been traced on the megalithic pottery.

(i) *Symbol 54* (pl. XXXIII, *1-4*)

The symbol evidently represents a human figure in various stylized forms.

The particulars of the illustrated examples are as follows.

1. Nevasa; chalcolithic; red ware; post-firing; DCP.
2. Rangpur; chalcolithic (Rangpur II C); Lustrous Red Ware; post-firing; ASI.
3. Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.
4. Rangpur; chalcolithic (Rangpur III); coarse red ware; post-firing; ASI.

(ii) *Symbol 55* (pl. XXXIII, *5*)

The symbol consists of a vertical line emerging from the lower end of which are two loops, one on each side. It roughly resembles the early Brāhmī letter *ya*.

The particulars of the illustrated example are: Navdatoli; chalcolithic; red ware; post-firing; DCP.

(iii) *Symbol 56* (pl. XXXIII, *6* and *7*)

The symbol (no. 6) consists of a pair of parallel vertical lines cutting another pair of parallel horizontal lines. The upper and lower ends of the right-hand vertical line are joined, by means of oblique strokes, with the right-hand ends respectively of the upper and lower horizontal lines. Likewise, the upper and lower ends of the left-hand vertical line are joined with the left-hand ends respectively of the upper and lower horizontal lines.

In the variant form (no. 7), the same symbol is repeated diagonally over itself.

The particulars of the illustrated examples are as follows.

6. Rangpur; chalcolithic; painted Lustrous Red Ware; post-firing; PWMB.
7. Navdatoli; chalcolithic; black-and-red ware; post-firing; DCP.

(iv) *Symbol 57* (pl. XXXIII, *8* and *9*)

The symbol (no. 8) may be said to be the conventional representation of a star, having five prongs.

In the variant form (no. 9), two of the adjoining prongs are further joined by a loop.

The particulars of the illustrated examples are as follows.

8. Rangpur; chalcolithic (Rangpur II C); coarse red ware; post-firing; ASI.
9. Tekwada; chalcolithic; black-and-red ware; post-firing; ASI.

(v) *Symbol 58* (pl. XXXIII, *10*)

The symbol consists of a vertical line joined about its middle, on each side, by an oblique line diverging upwards. The oblique line as well as the upper part of the vertical line are cut by small strokes. The symbol may perhaps be regarded as a conventional representation of a tree.

The particulars of the illustrated example are: Prakash; chalcolithic; black-and-grey ware; post-firing; ASI.

(vi) *Symbol 59* (pl. XXXIII, *11*)

The symbol consists of an oblong with the diagonals.

The particulars of the illustrated example are: Rangpur; chalcolithic; red ware; post-firing; PWMB.

(vii) *Symbol 60* (pl. XXXIII, *12*)

The symbol consists of an oblong divided into two compartments by a horizontal stroke.

The particulars of the illustrated example are: Rangpur; chalcolithic; black-on-red ware; post-firing; PWMB.

(viii) *Symbol 61* (pl. XXXIII, *13*)

The symbol may vaguely be described as an elongated 'S'.

The particulars of the illustrated example are: Navdatoli; chalcolithic; black-on-red ware; post-firing; DCP.

3. DISCUSSION

A. Antiquity of the symbols

As stated in the opening paragraph of the paper, the present search was instituted mainly to find out if, how far and how many of the symbols occurring on the megalithic pottery of south India can be traced backwards in time. And it is felt that by now the reader must have seen for himself the trend of the evidence. To recapitulate, out of the total of sixtyone symbols noted so far, as many as fortyseven are common to the megalithic pottery on the one hand and the Harappan and post-Harappan chalcolithic on the other. Of the remaining, six are exclusive to the megalithic pottery and eight to the Harappan and post-Harappan chalcolithic. Here it is not claimed that all symbols on both the 'fronts' have been exhausted—far from it. At the same time, it must also be stated that, as the sites covered so far are fairly representative of the concerned cultures, the data cannot also be called meagre. If this latter position is conceded to, the results become self-eloquent. For, invoking statistics, it transpires that eightynine per cent of the megalithic symbols go back to the chalcolithic-Harappan times. Conversely, eightyfive per cent of the Harappan-chalcolithic symbols continue down to the megalithic times.

Such a commonness of the symbols between the two sets of cultures at once raises the questions: why and how? And unless it is argued that the symbols are of a very casual nature and thus their commonness in the two cultures is not of much consequence, or that the commonness is sheerly accidental—in that case a percentage of nearly ninety will have just to be skipped over, the inevitable answer that suggests itself is that the commonness may perhaps be due to the commonness of ideas between the cultures. Once this line of argument is followed, up comes the question regarding the carriers of the symbols, namely, the persons responsible for the concerned cultures, for ideas cannot exist without the human mind. This would automatically bring us to the rather ticklish question: whither did the Harappans go? Recent excavations at Lothal and Rangpur have shown that the Harappans did not vanish in the air but survived on the *terra firma* through the Lothal B stage to Rangpur II C and III stages. This is what had happened in Gujarat; and it would only be reasonable to think on similar lines in respect of other areas as well. In fact, the belief that many of the traits of the chalcolithic cultures of central India and northern Deccan may ultimately be derivable from the Harappa culture itself is gaining ground as more and more evidence keeps on coming up in that direction. (There would, of course, be the incorporation of new ideas and items from elsewhere.) If that be so, the crucial question remains as to how these chalcolithic cultures are to be related to the megalithic ones. In their mature forms, the two sets of cultures stand wide apart, the chief points of difference, so far as the present discussion is concerned, being the presence of the Black-and-red Ware, fractional burial with lithic appendage, and iron

in the megalithic culture. But is there any bridge between the two? Any transition, combined, no doubt, with extraneous influences? To say that one can answer the question fully and finally in the present state of our knowledge would indeed be an overstatement. At the same time, the following observations may perhaps usefully be recorded.

The comparative evidence from Gilund and Navdatoli shows that, in its earliest stages at the former site, the white-painted black-and-red ware may be placed round about 1500 B.C.[1] At Lothal, which—for all we can say at the moment—perhaps dates back earlier, the techniques of producing a black-and-red ware and of applying a whitish paint thereto were known right from the beginning. Thus, in India, the antiquity of black-and-red ware in general may perhaps be much earlier than what has been supposed so far. Proceeding towards the other end of the scale, i.e. towards the Christian era, we find that whereas in the earlier levels of Navdatoli the black-and-red ware is painted, in the later levels, i.e. at Maheswar, a site occupied perhaps in continuation of Navdatoli, the paintings disappear. Somewhere in between stand the sites of Bahal and Tekwada. In the combined picture that is presented by them we have microliths, copper, black-on-red ware, black-and-red ware (noted at least in one case to have been painted in white), and last but not least a burial practice in which not only is the fractional element present but a lithic appendage, though of a somewhat feeble kind, also shows itself.[2] For further links one may profitably look to Brahmagiri and Maski. At the former site, as has been pointed out by Subbarao[3] and others, the shapes in the black-and-red ware found in deposits preceding the construction of two of the megalithic cists are comparable with those from Tekwada. Alongside, there also occurred a specimen of the black-on-red ware.[4] At Maski are met with burials which, for our present purpose, are divisible into the following categories: (i) extended burial without lithic appendage; (ii) extended burial with lithic appendage; (iii) fractional burial without lithic appendage; and (iv) fractional burial with lithic appendage—all belonging to the megalithic culture. Thus, do we not have here a case of co-existence of burial types common to the two sets of cultures under discussion? Further, can we call the Maski stage a transitional one so far as the burial practices are concerned? But certainly highly specialized lithic structures such as the cist still remain to be explained.

And what about iron? Although evidence of iron in the late levels of the Painted Grey Ware is available partly from Hastināpura[5] and mostly from Alamgirpur,[6] the question is as to how the megalithic folk got it. In this connexion it may not be out of place to mention that in the recent excavation at Sardargarh, District Ganganagar, Rajasthan, has been obtained, in otherwise Painted Grey Ware levels, a specimen of the bowl of black-and-red ware with sharp carination—a feature rather unusual in the Painted Grey Ware but more common in the late stage of the black-and-red ware at Ahar. The Painted Grey Ware levels at Alamgirpur also yielded a few specimens of the unpainted black-and-red ware.

At this stage it may also be worth while to record that graffiti have not so far been noted on the Painted Grey Ware. This serves to emphasize the initially isolated character of the culture associated with that Ware. But, as time passed, the Painted Grey Ware people seem to have come in contact with the black-and-red ware (and perhaps late

[1] *Indian Archaeology 1959-60—A Review*, p. 44.

[2] Information from Shri M. N. Deshpande.

[3] B. Subbarao, *Personality of India* (Baroda, 1958), pp. 173-79.

[4] Wheeler, *op. cit.*, pp. 221-23.

[5] B. B. Lal, 'Excavations at Hastināpura, etc'., *Ancient India*, nos.10 and 11 (1954 and 1955), p. 13.

[6] *Indian Archaeology 1958-59—A Review*, p. 54.

chalcolithic) people. As a result of such a contact alone can be explained the occurrence of graffiti on the black-and-red ware at Sonpur (e.g. pl. XXXIV A) and on the unpainted grey ware (a successor of the Painted Grey Ware) and the Northern Black Polished Ware at Sonpur (pl. XXXIV B) and Rajghat.

B. Significance of the symbols

As to the significance or probable meaning of the symbols indeed nothing categorical can be said in the present state of our knowledge. However, the following facts about them may usefully be observed.

1. They are usually post-firing, although pre-firing examples are not rare in both the chalcolithic-Harappan as well as megalithic contexts.

2. They occur in the habitational strata as well as in burials.

3. No symbol is restricted to any particular type of burial; and more than one symbol occur in one burial.

4. They are not restricted to any particular type or fabric of pottery, whether in the megalithic context or in the chalcolithic-Harappan.

5. They occur singly on a pot or are repeated twice or thrice on the same pot. Or, the same pot may bear two or three different symbols. In this last case, they are usually distributed along the girth of the pot. In the case of Sanur (rare examples elsewhere also), three symbols occur in such close proximity to one another as to give the impression of a record. It may, however, be added that the three symbols interchange their positions on different pots, producing all possible combinations.

With these facts, let us now discuss the various possibilities about the significance of the symbols.

As in most cases the symbols are post-firing, it cannot be said that they represent merely the potters' marks. Likewise, the possibility that they represent exclusively the owners' marks is also rendered futile because some of the symbols were incised even before the firing of the pot, unless, citing modern parallels, it is argued that the owner had placed a prior order with the potter. The responsibility, therefore, may be divided between the potter (for the pre-firing marks) and the owner (for the post-firing marks).

Now, while in the case of the potter the purpose of scratching is self-evident, the question would arise as to what was the purpose in the case of the owner. Does the symbol represent the owner's name, or a part thereof, or his clan or profession? Or, are we to think that in the post-firing cases, the symbols had no particular significance whatever and were scratched just because the owner felt like doing so? This latter possibility, however, does not seem to be tenable as the symbols occur not merely on sherds in the habitation-area where they might be explained away as stray but also on pottery placed systematically in graves. Thus, definite meaning and purpose seem to be involved in the case of post-firing examples too. In this connexion what is really necessary is a very careful and detailed recording, in future, of graffiti-bearing pots in burials. For example, one would like to know if the number of clusters of pots in a given burial corresponds to the number of persons buried and whether the pots in each cluster have the same symbol or, if two or more symbols are involved, whether there is one symbol common to all the pots in a cluster. Such an analysis might lead to the interrelationship of the symbol with the person. More than that cannot be said at present.

In this connexion one has also to keep the eye open to the fact that some of the symbols occur on the Harappan seals on the one hand and in the early Brāhmī alphabet

on the other. Is that a mere coincidence? But to stress the point that the symbols do have a phonetic, syllabic or alphabetic value would indeed be presumptuous in the present state of our knowledge.

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THE NEOLITHIC PATTERN OF INDIA

By V. D. Krishnaswami

CONTENTS

1. INTRODUCTION

THE FIRST FIND OF A NEOLITH IN INDIA WAS MADE IN 1860 BY H. P. LE MESURIER, who drew attention to his discovery of ground and polished stone implements in the valley of the East Tons river, in the United Provinces (now Uttar Pradesh). For eighty years since then, neolithic artefacts of various types have been collected in all parts of India from the surface. The collection, however, proceeded on unscientific lines based on haphazard selection, and the material has found its way into museums in India and abroad without any value for a cultural or chronological classification. Even with a vast lithic collection, all that could be said of them, even as late as 1944, was that 'the neolithians of India were principally tool-makers and hence culturally inferior to the neolithic Egyptians who knew, in addition to tool-making, agriculture, domestication of animals, manufacture of pottery, and textile industry '.[1] Somewhat later, in 1949, Worman stated that there was no Indian culture that could surely be called ' neolithic '.[2] He would perhaps not have made this statement had he known the results of Wheeler's excavation, in 1947, of the Brahmagiri site in northern Mysore,[3] confirming the chalcolithic-neolithic culture identified as early as 1942 by Krishna.[4]

By definition, the neolithic culture pertains to the Stone Age, and the primary trait that sets it apart from the other cultures of that Age is deliberate food-production, as opposed to mere food-gathering, as the means of subsistence. This trait is found in the occupations of agriculture and animal-husbandry. The secondary traits often associated with the neolithic culture are manufacture of pottery and smoothed stone tools. A full-fledged neolithic site may, therefore, be characterized by the remains of domesticated animals and plants, pottery and smoothed stone tools. The absence of metal in an archaeological complex containing this triple trait, or stratigraphic evidence proving that the complex existed prior to the introduction of metal into the area, is also a prerequisite to the identification of a site or culture as neolithic.

On the basis of this definition, Worman plotted the sites at which Indian smoothed stone celts had been found.[5] Accordingly, they were noted to occur almost exclusively in Assam and Bengal and central and southern India—south of the Ganga plain, north of Puddukkottai and east of a line drawn in a south-south-westerly direction from Lucknow in Uttar Pradesh to Goa on the west coast. As a result of their typology and distribution, he drew tentative conclusions, which, as he himself admitted, were based on incomplete

[1] S. N. Chakravarti, 'An outline of the Stone Age in India', *Jour. Roy. Asiatic Soc. Bengal (Letters)*, (1944), pp. 81-96, particularly p. 94.

[2] E. C. Worman Jr., ' The " neolithic " problem in the prehistory of India ', *Jour. Washington Academy Sciences*, XXXIX, (1949) pp. 181-201.

[3] R. E. M. Wheeler, ' Brahmagiri and Chandravalli (1947): megalithic and other cultures in the Chitaldrug District, Mysore State ' *Ancient India*, no. 4 (1947-48), pp. 180-310.

[4] M. H. Krishna, ' Prehistoric Deccan ', Presidential Address, *Proc. Ind. Science Congress* (1942).

[5] Worman, *op. cit.*

information and should be checked, primarily more with the archaeology of the future than with that of the past. His conclusions are briefly: (i) in India there is no positive proof in regard to the existence of neolithic peoples at any time before or after the use of metal came into being; (ii) Indian smoothed stone celts of neolithic type, regardless of their cultural affiliation, appear to have mainly been derived from south-east Asia at different dates; and (iii) a typological comparison of Indian and Far Eastern celt-types corroborates the above postulate and supports the theory that certain Indian types are earlier in date than the others, and that the eastern half of India belonged to a fairly large south and south-east Asian culture, throughout which the evolution of the post-Pleistocene prehistoric cultures were apparently similar.

Central and western India, as depicted by Worman, were *terra incognita*, because there were no neolithic finds beyond what Foote had collected round about Maski and Raichur. With the discovery of polished pointed-butt axe culture at Brahmagiri by Wheeler,[1] Worman's postulates (i) and (ii) are untenable and the other has to be revised in the light of recent discoveries and researches in India by Sankalia,[2] Subbarao,[3] Dani,[4] Sen[5] and Ray and in south-east Asia by Tweedie[6] and Colani.[7]

A brilliant decade followed the Brahmagiri excavation by the location of many centres of a new chalcolithic-neolithic culture in central and western India as revealed by the excavators at Nasik on the Godavari, Jorwe and Nevasa on the Pravara, a tributary of the former river, and Maheswar and Navdatoli on the Narmada, by Sankalia and his team,[8] at Tripurī in the upper reaches of the Narmada valley by Dikshit,[9] at Bahal on the Girna (a feeder of the Tapti), by Deshpande,[10] at Maski in the Krishna basin and at Prakash on the Tapti, both by Thapar,[11] and at Nagda on the Chambal by Banerjee[12]. Recent surface-explorations also have brought to light many other similar sites in Bijapur, Belgaum and other places, 'all comprised in the stretch of land between Nagda on the north and Brahmagiri in the south—roughly extending from the Tropic

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[1] Wheeler, *op. cit.*

[2] H. D. Sankalia and S. B. Deo, *Report on the Excavations at Nasik and Jorwe* (Poona, 1955); H. D. Sankalia, B. Subbarao and S. B. Deo, *The Excavations at Maheshwar and Navdatoli* (Poona-Baroda, 1958); *Indian Archaeology 1955-56—A Review* (New Delhi, 1956), p. 8. [Now add: H. D. Sankalia, S. B. Deo, Z. D. Ansari and S. Ehrhardt, *From History to Pre-history at Nevasa* (1954-56) (Poona, 1960).—Ed.]

[3] B. Subbarao, *The Stone Age Cultures of Bellary*, Deccan College Dissertation Series, no. 7 (Poona, 1948); *The Personality of India*, 2nd ed. (Baroda, 1958).

[4] A. H. Dani, *Prehistory and Protohistory of eastern India* (Calcutta, 1960).

[5] D. Sen, 'A note on celts and chisels from West Bengal', *Science and Culture*, 1948; 'A celt-site in Singhbhum', *Man in India*, XXX (1950), pp. 1-12; Sen and Uma Chaturvedi 'Further finds of stone axes in Singhbhum in India', *ibid.*, XXXV (1955), pp. 303-14; Sen and Uma Chaturvedi, 'Further studies in Singhbhum neolithic typology', *ibid.*, 38 (1958), pp. 176-85.

[6] M.W.F. Tweedie, 'Report on excavations in Kelantan', *Jour. Malaya Br. Roy. Asiatic Soc.*, XVIII, no. 2 (1940), pp. 1-22; 'Stone Age in Malaya', *ibid.*, XXVI, pt. 2, (1953), pp. 1-86; Tweedie and Sieveking in *Illustrated London News*, 5th March 1955, pp. 405-07.

[7] M. Colani, 'L 'age de la pierre dans le province de Hoabinh (Tonkin)', *Mem. Service Geol. Indo-China*, XIV, no. 1 (1927); M. Colani in *Bulletin de l'Ecole Française d'Extrême Orient*, XXX (1930), pp. 337-41.

[8] Sankalia etc. *op. cit.* (1958).

[9] M. G. Dikshit, *Tripuri—1952* (Nagpur, 1955).

[10] *Indian Archaeology 1956-57—A Review* (New Delhi, 1957), pp. 17-18.

[11] B. K. Thapar, 'Maski 1954: a chalcolithic site of the southern Deccan', *Ancient India*, no. 13 (1957), pp. 4-142; *Indian Archaeology 1954-55—A Review* (New Delhi, 1955), p. 13.

[12] *Indian Archaeology 1955-56*, pp. 11-19.

of Cancer to 15°N. Latitude—a distance of about 600 miles. The fact that this culture transcended the respective limits of the latter-day Aryan and Dravidian language-zones may not be without import."[1] There is a broad uniformity in the equipments of the culture, viz., the use of painted pottery, and, to a restricted degree, copper and the typological similarity of polished stone axes of Brahmagiri and Nevasa and the existence of ribbon-flake microliths.

Dani has made a special study of the neolithic culture of the east India and south-east Asia and has succinctly made out that the neolithic elements came in different waves at different times from the latter region into the former through Burma and that a definite chronology can be ascribed on the basis of a black polished ware associated with the specialized tools of the later complex in Malaya.[2]

We have also to take into account the isolated neolithic culture of Kashmir, as represented at Burzahom.[3]

We have, therefore, four neolithic provinces in India. They are: A, central and western India; B, south India; C, eastern India; and D, Kashmir.

I propose to describe these four provinces and deal with the origin of the neolithic traits in each.

2. THE PROTONEOLITHIC PHASE

Before, however, dealing with the quadruple division of the Indian neolithic complex, it is necessary to review briefly certain lithic industries brought to light in the Narmada basin at Hoshangabad in Madhya Pradesh by De Terra, in the Sabarmati basin in Gujarat by Sankalia and Subbarao, and in Mirzapur, Uttar Pradesh, by Cockburn, besides those of Sukkur, Rohri, Karachi and other places in Pakistan.[4] All these have to be considered as protoneolithic in character (fig. 1), forming the basis of the Indian neolithic complex.

A. The Narmada valley

The new alluvium of the third aggradational phase in the Narmada is equated to the cotton soil, corresponding to Terrace 5 of the Sohan in Panjab. In its basal gravel and sands and in the lower few feet of *regur*, De Terra and Teilhard found a flake-industry in jasper and flint dominated by microlithic blades and scrapers, homologous with the mesolithic culture and akin to the Capsian of Syria and Africa. They call this industry protoneolithic or even a late industry that might have flourished in recent times in the rock-shelters near Hoshangabad and elsewhere.[5] Since it contained occasionally fluted cores, which are characteristic of the succeeding protohistoric cultural phase, as seen at Maheswar lower down the river, typologically and technologically this industry leads to the advanced microlithic industry of the succeeding chalcolithic phase spread all over central and western India. Since stone mace-heads with typical hour-glass section are found

[1] A. Ghosh in *Ancient India*, no. 12 (1956), p. 1.

[2] Dani, *op. cit.*

[3] H. De Terra and T. T. Paterson, *Studies on the Ice Age and Associated Human Cultures* (Washington, 1939), pp. 233-34. [See below, p. 34, n. 5, and p. 63, n. 2.—Ed.]

[4] V. D. Krishnaswami, 'Stone Age India', *Ancient India*, no. 3 (1947), pp. 11-57, particularly pp. 36-38.

[5] De Terra and Paterson, *op. cit.*, p. 320.

stratigraphically over this industry at Navdatoli, De Terra's description of it as proto-neolithic is confirmed.[1] At Choli, not far from Maheswar in the interior, Sankalia also found huge cores, about 3 ft. in length, in variegated jasper and number of microliths around exposed veins of jasper, suggesting factory-sites of the same phase.[2]

B. The Sabarmati valley

Further north, in the Sabarmati valley, there is a marked concentration of microlithic sites at Langhnaj near Mehsana in north Gujarat.[3] Even in central Gujarat, the same culture predominates. The commonest type of implements is the lunate or crescent. The asymmetrical lunate here is one of the few items that distinguish this hunting microlithic industry of Langhnaj from the Wilton industry of south Africa. Backed blades are absent altogether. There are doubtful remains of the dog and bovine fauna; but the food-remains of Langhnaj indicate game-animals. In the Langhnaj industry three zones of microliths are found without any variation in types. In the first zone, extending from the surface to a depth of 3 ft., the microliths are associated with comparatively recent potsherds, along with a long tanged iron dagger. In the second zone, at a depth of 3 to 4 ft., where an ancient land-surface is met with, a different type of pottery, with incised lattice-decorations, is found. The pottery is thin and red-slipped over a pale-brown surface with a cowdung-like greenish-yellow core. Besides microliths, a large quartzite mace-head with an hour-glass section and pieces of two neolithic celts of chlorite-schist belong to this zone. The third zone, from 4 to 8 ft., is the pure microlithic zone. Sandstone quern-fragments are generally found below 4 ft., which is below that at which pottery is found; therefore, some primitive form of agriculture was practised before pottery came into use. Thus, in Gujarat we have evidence of a microlithic folk being introduced to agriculture and pottery and the original mesolithic food-gatherers becoming neolithic food-producers, albeit on a very restricted scale. Zeuner states that this should be verified by the existence of domesticated animals in the lowest, pre-pottery, microlithic zone in addition to the quern-stones.[4] Not far from Langhnaj is Sojanipur, an important chalcolithic-neolithic site, assignable, on the evidence of painted pottery and parallel-sided blades, to the first millennium B.C.[5]

The other sites in central India that show evidence of the use of microliths and pottery at the same time are Pachmarhi and Morhana-Pahar.[6] The Pachmarhi rock-shelters exhibit human occupation down to a depth of 51 in. There is very little pottery below a depth of 18 in., as indicated by Hunter. The pottery is mostly a black ware with occasional fragments of a whitish pottery of thick section of the same antiquity.[7] The Pachmarhi evidence follows that of Langhnaj very closely. The discovery of pottery in association with microliths at Morhana-Pahar in the same region by Carlleyle helps to strengthen the Pachmarhi evidence.

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[1] *Indian Archaeology 1957-58—A Review* (New Delhi, 1958), p. 32.

[2] Subbarao, *op. cit.* (1958), p. 67.

[3] H. D. Sankalia, 'The microlithic industry of Langhnaj, Gujarat', *Jour. Gujarat Res. Soc.*, XVIII (1956), pp. 275-84.

[4] F. E. Zeuner, 'The microlithic industry of Langhnaj, Gujarat', *Man*, LII (1952), pp. 129-31.

[5] Information from Shri S. R. Rao.

[6] D. H. Gordon, 'The stone industries of the Holocene in India and Pakistan', *Ancient India*, no. 8 (1952), pp. 64-90.

[7] *Ibid.*, pp. 73-75.

Fig. 1

Sukkur: Group A, 1, flake, 2 and 3, blades; Group B, 4, blade, 5 and 6 flakes; Group C, 7, flake, 8, core

Rohri: 9 and 10, cores; 11, pick-like implement; 12 to 16, blades
Sukkur and Rohri: 17, core; 18 and 20, crested flakes
Kot-Diji: 21, crested flake
Hisbani: 22, crested flake
Jericho: 23 and 24, crested flakes
Jerash: 25, crested flake
Makertu: 26, core

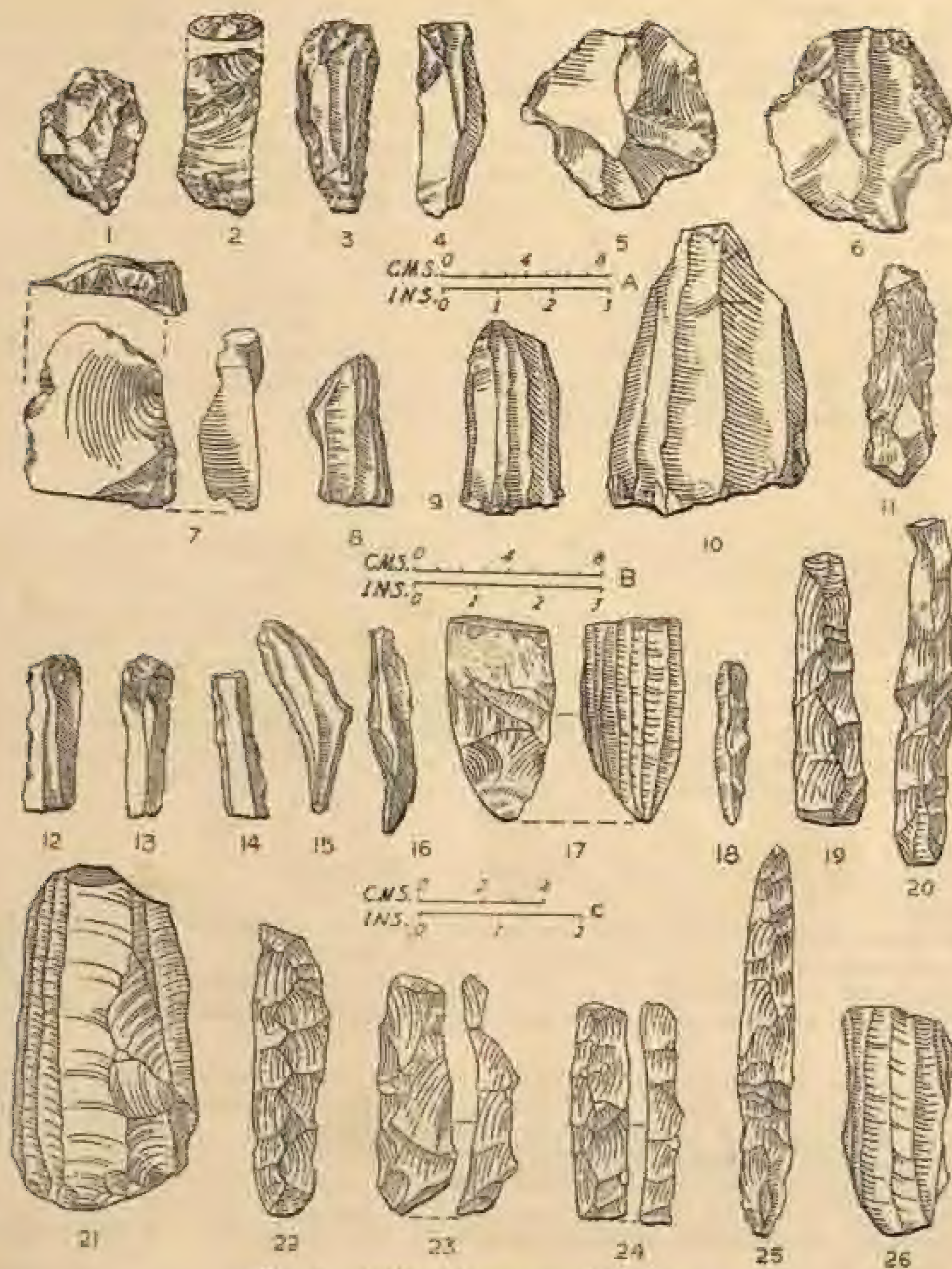


FIG. 1. *Artefacts from protoneolithic phase*

C. The Krishna valley

The evidence mooted at Langhnaj in Gujarat, in the Sabarmati valley, is confirmed by the excavations at Nagarjunakonda[1] in the Krishna valley. The clear stratigraphical evidence obtained here shows that the pre-pottery microlithic industry on chert and chalcedony was succeeded by a mixed lithic industry containing the true hunting-type of microliths, along with coarse flakes of trap and quartzite made of a different technique and wheel-made pottery. At another place in the valley, similar coarse flakes are found in clear association with polished neolithic axes of trap, of the same type as the usual double-convex Brahmagiri ones. But the most characteristic neolithic tool-form in the valley is the 'shoe-last' axe, not found in the eastern zone.

Subbarao's suggestion[2] of an early protoneolithic industry, characterized by heavily-patinated flakes of trap and sandstone with a crude microlithic industry of quartz and chert, but without any evidence of pottery, in Phase I at Sanganakallu and the find by Seshadri[3] of a flake-industry of jasper, flint and chert on the surface at Brahmagiri, having some resemblance to Phase I at Sanganakallu and styled 'Brahmagiri Pre-I', which, however, has not been encountered the excavation, have been amply confirmed by the evidence obtained in the excavations at Nagarjunakonda.

D. The Kon valley

A flint-industry was reported at Mirzapur in the Kon ravines by Cockburn in 1894.[4] He found polished celts of basalt and flakes and blades of chert derived from the lower Vindhyan limestone and pointed out that the only other locality in India where such flakes and blades had been found was Rohri in Sind. Except for a few specimens collected in 1883 by Hodges and deposited in the Lucknow Museum, the material collected by Cockburn is lost; his notes, too, are scanty and are marred by bad illustrations. Therefore, a fresh exploration appears necessary here for finding out the relationship between the ribbon-blades of flint and the polished celts of basalt and assessing the real nature of the site—whether it is protoneolithic (as Sukkur and Rohri) or otherwise.

E. Sukkur and Rohri

A stone industry that might be looked upon as preparatory to the chalcolithic cultures of Indus valley and Baluchistan is probably the one found at Sukkur and Rohri.[5] De Terra found two groups of sites, one on the flint-bearing Eocene hill, west-north-west of Sukkur, and the other on the opposite bank of the Indus, south-east of Rohri. The

[1] K. V. Soundara Rajan, 'Studies in the Stone Age of Nagarjunakonda and its neighbourhood', *Ancient India*, no. 14 (1958), pp. 49-113. After the publication of the article, the author visited the excavations and noted some additional evidence exposed thereafter.

[2] Subbarao, *op. cit.* (1948), pp. 1-62.

[3] M. Seshadri, 'The microlithic industries of Mysore', *An. Rep., Inst. Arch., University of London*, no. 9 (1953), pp. 29-38. He points out that a large number of parallel-sided blades, points and retouched blades, like those from Maski and Brahmagiri, were found at Lodai in Kutch and are now in the British Museum.

[4] J. Cockburn, 'On the flint implements from the Kon ravines of south Mirzapur', *Jour. Asiatic Soc. Bengal*, LXIII, pt. iii (1894), pp. 21-27.

[5] De Terra and Paterson, *op. cit.*, pp. 331-36.

Sukkur and Rohri sites, though connected geologically, present distinct variations in their tool-types.

In the Sukkur industry, with no apparent stratigraphic sequence, the heavier tools, such as handaxes and big cores, are found concentrated near the base, and large scrapers are on the top interspersed with blades. On grounds of patination, in the absence of any other evidence, the implements can be placed into three groups, A, B and C, which merge into each other. Group A shows a dark-brown desert-patination with lustre; blades are in the majority over flakes, cores being very few. Group B shows desert-patination with no lustre; the artefacts are similar to those of Group A, the chief difference being the presence of concave-convex flakes, which show Levallois technique with flake-scars. Blades are thinner. Flakes are greater in number than in Group A, and cores are common as in Group C. Group C is fresh and unpatinated. Flakes greatly outnumber blades; there are concave-convex flakes as in Group B. The cores are small, conical and fluted, the flake-scars converging at the apex. These are similar to those in the earliest levels at Mohenjo-daro.

The Rohri industry, with large quantities of flint cores and flakes, falls in Group C of Sukkur. There is also a pick-like tool trimmed out of a thick blade which has been described by Subbarao as a 'crested-guiding-ridge' flake.[1] Similar flakes are found in the Sturge collection from Sukkur and Rohri of the British Museum, varying in length from 10 to 12 in.[2]

The combination of so many different techniques in these industries suggests that they are very late and is indicative of an age approaching the chalcolithic civilization of the Indus valley. From the geological angle, however, De Terra ascribes to these Stone Age sites an age somewhat greater than what their typological evidence would admit. This accords with the evidence from further west—Palestine and Iraq.[3] In the Fertile Crescent, such an industry appears in purely neolithic levels, as at Jericho, where this new technique of 'crested-guiding-ridge' flake for the mass-production of blades started among the earliest agricultural communities.

F. Karachi

Another lithic industry deserves consideration in this context : it is the one found at a golf-course near Karachi, wherefrom Todd collected lithic tools, now in the British Museum. Lal, who studied them, points out that the artefacts include along blades, points, scrapers, trapezes and crescents, besides fluted cores.[4] Subbarao, who also saw the same collection, points to the existence of a crested flake.[5] A fresh exploration of the site is desirable with a view to finding out if there is any pottery associated with these tools

G. Kashmir

Pottery and flakes found at Sombur in Kashmir and in the alluvial deposits on the Jhelum and also at Burzahom and Pampur led De Terra to state: 'In all these places it

[1] B. Subbarao, 'Chalcolithic blade industry of Maheshvar (central India) and a note on the history of technique', *Bull. Deccan Coll. Res. Inst.*, XVI (1955-56), pp. 122-56.

[2] *Ibid.*

[3] A. E. Dorothy Garrod, 'The Stone Age of Palestine', *Antiquity*, VIII (1934), pp. 133-50.

[4] B. B. Lal, 'Protohistoric investigation', *Ancient India*, no. 9 (1953), p. 82.

[5] Subbarao, *op. cit.* (1955-56), p. 139.

was certain that the flakes are associated with pottery-bearing layers of either neolithic or historic date... Notwithstanding these observations, it is still possible that the flakes found in the lowest Jhelum terrace represent a late palaeolithic or protoneolithic culture."[1] The evidence of Uchali, west of Naushera in the Salt Range, West Pakistan, seems to bear this out, as stray finds of microliths of jasper of flint from the Potwar loess-surface may have been derived from a fossil-soil of sub-recent origin.[2] Besides, there was the association of a burial in the implementiferous layer, which yielded hand-made pottery, presumably of neolithic character.

H. The Zhob valley

Ross demonstrated five occupational deposits at Ranaghundai in the Zhob valley.[3] The earliest level is characterized by plain hand-made pottery and flint blades. Domesticated animals are represented by sheep (*Ovis vignei*), horse (*Equus caballus*) and cattle (*Bos indicus*). The second phase is distinguished by wheel-made painted red pottery, bearing designs of stylized bull and black-buck. There is a striking similarity between this pottery and that of Hissar I, and it is not unlikely that it represents an infiltration from the Iranian uplands in the second half of the fourth millennium B.C.

The existence of a pre-pottery microlithic culture has been reported by Fairservis at Kile Gul Mohammed in Baluchistan.[4] Here, below the pre-Harappan Kichibeg culture, were found two phases: first, a pre-pottery microlithic culture, Kile I, characterized by flint flakes and fine polyhedral cores; next, Kile II, marked by the presence of wheel-made and hand-made pottery, some crudely painted in black, red and brown with geometric and mat-marked designs. Stone axes, flaked scrapers (flake-blades) and knives (blades) also occur. Broadly, the Kile Gul Mohammed culture may be placed in the early fourth millennium B.C.

The components of the protoneolithic phases in India and Pakistan would show that if there were to be a real neolithic phase in the same region, it should exhibit a microlithic industry as a hold over into the neolithic, along with the ribbon-blade industry of Sukkur and Rohri. This is exactly what happened in the newly-discovered chalcolithic-neolithic sites of central and western India, as far south as Brahmagiri. Polished stone axes have not been reported either in central India or western India in any protoneolithic phase, and its evidence in Kashmir[5] can be attributed to a western influence from the Zhob valley in Baluchistan and the Iranian uplands, where a pre-Harappan neolithic culture is found.

3. PROVINCE A—CENTRAL AND WESTERN INDIA

Most of the chalcolithic-neolithic sites in central and western India are concentrated in the Deccan Trap area and are located in the valleys of the rivers Chambal, Narmada,

[1] De Terra and Paterson, *op. cit.*, p. 233.

[2] *Ibid.*, p. 277.

[3] E. J. Ross, 'A chalcolithic site in northern Baluchistan', *Jour. Near Eastern Studies*, V (1946), pp. 284-316.

[4] W. A. Fairservis Jr., 'Preliminary report on the prehistoric archaeology of the Afghan-Baluchi areas', *Noviates, American Museum of Natural History*, no. 1587 (1952), pp. 1-39.

[5] [Recent work at Burzahom will require a revision of De Terra's stratification of the site, *Indian Archaeology 1960-61—A Review* (New Delhi, 1961). See above, p. 28, n. 3, and below, p. 63, n. 2.—Ed.].

Tapti, Godavari, Krishna and Tungabhadra. I propose to make a rapid survey of the results of the excavations done in these river-valleys and finally discuss the significance of these discoveries from the point of view of their origin and diffusion.

A. The Chambal valley and south Rajasthan

(i) *Nagda*

In Madhya Pradesh, more than thirty chalcolithic-neolithic sites have been discovered in the Chambal valley. Banerjee undertook the excavation of one of the most typical of these sites, Nagda.[1]

The occupational deposits at Nagda, 32 ft. in depth, show three cultural periods, resting on the natural black cotton soil. Periods I and II are chalcolithic-neolithic in character. The earlier, Period I, is represented by a 22-ft. thick deposit. The lithic component of this culture includes microlithic tools, mostly parallel-sided blades, and fluted cores of chalcedony, quartz and carnelian, showing crested ridge. A few blades are retouched and their working side often serrated.

The ceramics consist of a dominant red- or cream-coloured ware, painted in black in various designs—horizontal bands, concentric semi-circles, connected loops, wavy lines, vertical radiating lines filled with hatched triangles along with sun-symbol and figures of the antler. There also exists a black-and-cream ware with oblique or vertical strokes and a crude grey ware with blackish core. Plain pottery is limited in quantity. The use of copper is restricted.

Period II is a continuation of Period I, with microliths persisting, but otherwise marked by the disappearance of the black-and-cream ware and the emergence of a wheel-made black-and-red ware and the Northern Black Polished Ware with iron.

(ii) *Ahar*

In the village of Ahar at Udaipur in Rajasthan, situated in the catchment-area of the Berach, there is a mound known as Dhulkot.[2] The occupational deposit of 30 ft. is represented by two main cultures, separated by a break. The first culture over the natural sandy soil could be divided into three phases with the characteristic black-and-red ware associated with plain red ware, with incised designs on the shoulders. Ghosh has pointed out that this region is not far removed from the fringes of the horizon of the Painted Grey Ware of north India.[3]

A large number of the black-and-red ware are painted in white, but sometimes in black with parallel lines and dots recalling the post-Harappan late chalcolithic phase of Rangpur in Kathiawad. In the final phase, the devolution of the ware sets in. Another ceramic tradition, a red ware painted in black on the slipped surface makes its appearance in the final phase. Microliths, consisting of parallel-sided blades and fluted cores, are also found in the middle and upper phase, with copper objects along with black-and-red ware.

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[1] *Indian Archaeology 1955-56*, pp. 11-19.
[2] *Ibid., 1954-55*, pp. 14-15; *1955-56*, p. 11.
[3] A. Ghosh in *ibid., 1954-55*, p. 2.

The upper culture, over a break, is probably contemporaneous with the Kushan times.

In Rajasthan, e.g., at Chitorgarh, Udaipur and Rairh near Jaipur, the existence of parallel-sided blades and fluted cores, along with black-and-red ware, would indicate the chalcolithic-neolithic period.[1]

B. The Narmada valley

(i) *Maheswar-Navdatoli*

A small town in East Nimar District, Maheswar is situated on the north bank of the Narmada, opposite which lies the tiny village of Navdatoli. While a few traces of a protohistoric cultural phase of painted pottery and microliths were discovered at both the sites, the occupational mounds here introduce a hitherto-unknown chalcolithic-neolithic phase in central India. In the earliest Phase, I, over the black cotton soil, there is a crude microlithic industry characterized by irregular and fluted cores and discoids of jasper and chert. The succeeding Phase, II, 5 to 8 ft. thick, is characterized by an advanced microlithic industry with painted and unpainted pottery. The microliths are characterized by long parallel-sided flakes, serrated blades and cores of milky chalcedony, agate, jasper and chert. The flakes are made into blunted blades with steep retouch on one side. The lunates are blunted on the arc. The triangles and trapezes are steeply retouched. The proportion of blades to geometric tools is in the ratio of 2:1. The most distinctive feature of this advanced microlithic industry is the deliberate use of the original fluted cores for making parallel-sided blades, pointed borers, etc., by alternate step-flaking. Other lithic characteristics are the flattish oval mace-heads with an hour-glass section, small stone balls, battered at double ends, primitive querns and plano-convex pestles. A polished stone axe, picked up from the surface near Mound II at Navdatoli, is also ascribed to this chalcolithic complex by Sankalia. The pottery from Mounds I and II shows a predominantly red ware, which persists to the last, whereas the black gradually dies out. Among the painted sherds, the black-on-red ware forms about eightynine per cent. The designs on the painted pottery include a variety of geometric and naturalistic designs and stylized human and animal motifs. There are hatched triangles, diamonds, parallel lines, semi-circles, leaves and creepers, dancing human figures and running antelopes. Though no complete vessels have been found, bowls and dishes with stands and bowls having channels or cut spouts are noteworthy. Besides, there is also incised pottery. There is a very small amount of copper in the shape of hooks, pins and chisels.

The next Period, III, is defined by the presence of the Northern Black Polished Ware, black-and-red ware and punch-marked coins, with iron tools. The chalcolithic-neolithic culture is dated roughly before 500 to 1500 B.C. or earlier, since Period III shows definite association of the Northern Black Polished Ware and punch-marked coins going to at least 400 B.C.

(ii) *Mehgam and Telod*

Special reference should be made to two sites, Mehgam and Telod both near the Narmada estuary.[2] Ghosh points out that a preliminary examination of their material

[1] Information from Shri S. R. Rao.

[2] *Indian Archaeology 1956-57*, p. 1.

shows late Harappan pottery, indicating the southernmost stations of the Harappa culture, which is significant in the origin of the central Indian chalcolithic-neolithic phase.

(iii) *Tripurī*

In the upper Narmada valley, near Jabalpur, Dikshit brought to light at Tripurī the existence of a puzzling microlithic industry in the lowermost brownish silty clay (black cotton soil), below the Mauryan stratum, separated from it by a sterile pebble-bed.[1]

Associated with the microlithic industry was a wheel-made red painted pottery with horizontal bands in black. Dikshit regards this as different from the red painted ware at Brahmagiri, Jorwe, Bahal or even Maheswar, from the fact that the painting is extremely thick on the outside and the pots are treated with a micaceous slip in the inside. The microliths consist of long blades (up to 1½ in. in length), retouched, with battered back and even occasionally serrated, along with a large number of lunates and triangles. He further remarks that this mixed microlithic industry of urban and hunting-types is almost identical with the types found at Chhota-Simla (Jabalpur), Pachmarhi and other sites recorded by Gordon[2] and equates it to the protoneolithic industry of De Terra in the *regur* beds overlying the yellow silt of the Narmada valley between Narsinghpur and Hoshangabad. The association of the painted pottery with the blade-industry in the black cotton soil at Tripurī would, however, bring it within the ambit of the chalcolithic-neolithic culture of central and western India. The animal-remains in this layer are those of the wild boar (*Sus*) and ox or cow (*Bos taurus*).

C. The Tapti valley

(i) *Bahal*

Deshpande brought to light at Bahal, situated on the Girna river, a tributary of the Tapti, in East Khandesh District, five Periods in the occupational mound, with breaks between Periods I and II, and again between Periods III and IV and established the chalcolithic-neolithic nature of Period I, with the same sequence as at Nasik.[3]

Period I has two Sub-periods, A and B, both neolithic. Sub-period I A was distinguished by the globular jar with a flared rim in thick grey ware, reminiscent of the Brahmagiri burial-urn, bowl with a flat base and incurved rim and hand-made jar with incised oblique and criss-cross lines, or dot-and-chain patterns and applied finger-tip designs. A few sherds of thin grey ware, with painting in red ochre are also present. The tips of the knobs are also painted in red ochre.

The succeeding Sub-period, I B, shows wheel-made pottery, painted in black-on-red ware with a variety of designs—horizontal bands, hatched diamonds, triangles, concentric circles, parallel, criss-cross and wavy lines in between, foliage and rarely animal-figures, such as antelope and horse(?). A few sherds of a lustrous red-slipped ware recalled the post-Harappan Lustrous Red Ware of Rangpur as pointed out by Srivastava[4]; the carinated bowl and spouted vessel of the Jorwe type occur along with a terracotta lamp

[1] Dikshit, *op. cit.*, p. 18.
[2] Gordon, *op. cit.*, pp. 64-90.
[3] *Indian Archaeology 1956-57*, p. 17.
[4] K. M. Srivastava, ' A new post-Harappan ceramic ware in Saurashtra ', *Proc. Fortysecond Ind. Science Cong., Baroda*, III, Abstracts (1955), pp. 321-22.

with a stand in the upper levels of this Sub-period. Side by side, there appears, for the first time, a few sherds of burnished grey and black ware with oblique lines painted in white, as in Sanganakallu Phase II.

The lithic industry is essentially an urban one of chalcedony, agate and jasper, mostly of parallel-sided blades, sometimes serrated, and less frequently lunates and trapezes.

A limited use of copper is indicated by a shapeless lump of the metal.

Period II (*circa* 600-200 B.C.) marks a complete change with the emergence of iron and black and black-and-red wares, the latter being produced by inverted firing.

(ii) *Tekwada*

Another chalcolithic site was brought to light by Deshpande at Tekwada, opposite Bahal, across the Girna.[1] Here he found four burials related to Period I B of Bahal. Three were urn-burials laid on the natural black cotton soil and the fourth a pit-burial, cut deep into the underlying yellowish clay. The pit-burial contained the skeleton of an adult, 5 ft. 2 in. long, laid in north-south orientation, with two pots, one of grey ware and the other black-and-red ware painted in black curvilinear lines. This skeleton, found with long blades near its feet, points indubitably to the contemporaneity of the burials with Period I B of Bahal.

Near by there are other probable sites, such as are Changdev, on the confluence of the Tapti and Girna, and Patan, at the foot of the hill near Pitalkhora caves.

(iii) *Prakash and other sites*

About 100 miles lower down in the Tapti basin from Bahal, Thapar excavated the chalcolithic mound, 75 ft. high, at Prakash, on the confluence of the Tapti and the Gomai, exposing four cultural Periods.[2] The earliest period, datable to first millennium B.C., contained microliths. Copper, though known, was extremely scarce. The ceramic industry comprised a black-on-red painted pottery with designs consisting of diamonds, horizontal or oblique bands, criss-cross or wavy lines and ladder-patterns, along with animal-motifs. In association with this ware was found a thin burnished grey ware, as at Bahal, occasionally having linear designs in white. There were also thicker sherds of a coarser fabric in dull grey ware painted with ochre on the rim. The microlithic industry in this Period consists mostly of parallel-sided blades, a few of them serrated, some backed and a few converted into points, along with crescents and trapezes. From the rarity of the polished axes, the chalcolithic-neolithic sites located in the Tapti and the Narmada basins are seen to be different from those of the Godavari, Krishna and Tungabhadra river-basins.

Period II (*circa* fifth to first century B.C.), separated from Period I by a sterile layer, represents a full-fledged iron-using culture, characterized by black-and-red ware along with sherds of the Northern Black Polished Ware, as at Bahal and Maheswar, thus providing a datum for relative chronology.

As at the mouth of the Narmada, so also at that of the Tapti lies an important late-Harappan site, Bhagatrav near Surat, which contains parallel-sided blades that are characteristic of the chalcolithic-neolithic culture of the Tapti region.[3] As many as nine

[1] *Indian Archaeology 1956-57*, p. 18.
[2] *Ibid., 1954-55*, p. 13.
[3] *Ibid., 1957-58*, p. 15.

chalcolithic sites were recently noticed by Joshi round about Prakash on the banks of the Tapti.[1] The sites at Kukarmunda, Ashrava, Bahurupa, Satola and Koparli are comparatively rich in antiquities. Chalcolithic black-on-red ware, often associated with burnished grey ware and/or coarse grey ware and microliths, consisting of parallel-sided blades, scrapers, points, crested-ridge flakes and fluted cores made of chalcedony and chert, are the important antiquities found there.

D. The Godavari valley

(i) *Nasik*

At Nasik, Sankalia brought to light five main cultural Periods.[2] The earliest occupational layer of black clay at Mathi-chi-Gadi (Nasik) is characterized by advanced microliths, in association with pained pottery and a large amount of ochre-washed ware. This phase was styled protohistoric by Sankalia and assigned approximately to *circa* 1500-500 B.C., or even earlier. Subsequent explorations in this region have revealed a few identical elements of this culture at Bhojapur near Sinnar, Dhoki, Kopargaon, Nevasa and Paithan. In Ahmadnagar District, traces of the culture are found also at Gargaon, Kokamthan, Pravara-Sangam and Sangamner, with painted pottery and microliths.

The occurrence of microliths, in the basal habitation-layer, separated from the early historical one by a weathered horizon, constitutes one of the important discoveries at Nasik. About sixty per cent of the microliths were artefacts, such as cores, mostly fluted, blades with mid-ridge, blades backed with steep retouch, lunates and a few obliquely-blunted points. The distinctive light orange-(ochre-)coloured ware of this Period is characterized by a powdery surface along with a few sherds painted in black over a reddish surface. Both these wares are wheel-made. Besides, a few vessels show spouts and carination, which do not recur in the historic period.

Other wares of Period I include a pale whitish red ware, in association with a grey ware and a coarse black ware. The grey ware, being similar to the burial-urn at Jorwe and at Brahmagiri in Period I B, provides a link between the cultures of these two regions.

Bowls and dishes, as well as globular vessels, are the distinctive types of Period I. Besides, the sherds indicate the spouted vessel and bowl with carination, which do not occur later at Nasik but were found in abundance at Jorwe.

The bones found in this Period are those of the domesticated buffalo (*Bos bubalus*), ox (*Bos indicus*), pig (*Sus species*), sheep, goat and dog.

(ii) *Jorwe*

It is a single-culture site, on the left bank of the Pravara river, 5 miles east of Sangamner.[3] The majority of the microliths are flakes and cores. They exhibit a special crested-guiding flake and keeled-core technique, characteristic of the neolithic in western Asia and the Aegean. There are parallel-sided blades with crested ridge, parallel-sided double-edged blades, saw-like blades, backed blades and a few crescents. There is a variety

[1] Information from Dr. R. V. Joshi.
[2] Sankalia and Deo, *op. cit.* (1955).
[3] *Ibid.*, p. 148.

of fine fluted cores, fluted on one surface, flattened on the reverse, reminiscent of the 'ripple flaking on Egyptian Neolithic tools from the Fayyum Desert'.[1]

The bulk of the pottery is wheel-made, showing spouted vessels, but there are a few hand-made large storage-jars and dishes. The painted pottery shows horizontal panels, running round the neck, shoulder and belly. The affinity of the Jorwe painted pottery, particularly the spouts painted along their lengths with a single but identical spout in Period I of Nasik, suggests that the Jorwe culture may be contemporary, at least in part, with Nasik I.

Six unstratified flat celts of low-grade copper/bronze were discovered in a painted pot on the surface at Jorwe which could be assigned to Period I of Nasik. Daimabad, another chalcolithic site, yielded polished neolithic celts along with all varieties of the chalcolithic pottery.[2] Its geographical position, midway between Jorwe and Nevasa on the Pravara, is of great importance, as it links the Nevasa polished axes with the flat celts of copper of Jorwe.

(iii) *Nevasa*

The Ladmod mound at Nevasa on the south bank of the Pravara rests on black soil, as elsewhere. Five distinct cultural phases have been recognized here by Sankalia.[3]

The first phase is characterized by the presence of the Brahmagiri type of polished pointed-butt axes, a chisel and an adze, in trap, along with hammer-stones, round sling-stones of trap and quartz and microliths of chalcedony. The microliths are very similar to the blades of Maheswar and, showing the special technique observed at Jorwe, may include flakes, ripple-marked (fluted) cores, crested-ridge blades, serrated and backed blades, parallel-sided blades, obliquely-blunted blades, triangles, trapezes, scrapers and crescents. As the parallel-sided blades represent sixty per cent of the microliths, the industry is similar to the blade-industry of Maheswar, as pointed out by Subbarao. The use of metal in Phase I is evidenced by the discovery of a copper or bronze bead, a hook and a chisel, indicating a chalcolithic-neolithic age.

Except large storage-jars and burial-urns, the pottery is wheel-made and painted in black on fine red or chocolate surface. The commonest vessel is the bowl with flaring rim and rounded base with long side-spouts, painted along its length or at its edge. The painted designs are essentially geometric, consisting of hatched squares, triangles, rhomboids, intersecting circles and oblique lines, besides a few animal-motifs, representing deer, *pipal*-leaves and basket-patterns.

After this occupation the site was deserted. The succeeding Phase, II, separated by a sterile layer from the earlier Phase, is characterized by a red ware and the Northern Black Polished Ware and iron implements like sickles, daggers and plough-shares.

About 100 miles south-south-east of Nevasa, in the Godavari basin, a neolithic celt of the Brahmagiri type was found at Ter in District Osmanabad,[4] where remains of the early Sātavāhana period had previously been discovered.[5] Probably we have a chalcolithic-neolithic culture here, as at Nevasa.

[1] Sankalia and Deo, *op. cit.* (1955).
[2] Information from Shri M. N. Deshpande.
[3] See p. 27, n. 2.
[4] *Indian Archaeology 1957-58*, p. 23.
[5] *Ibid., 1954-55*, p. 61.

E. The Krishna valley

(i) *Maski*

Thapar exposed at Maski, in the Krishna basin, three Periods, with a break between Periods I and II, respectively chalcolithic-neolithic and megalithic.[1] The cultural equipment of Period I is characterized by the distinguished microlithic industry of chert, agate, opal and carnelian, along with a meagre supply of copper, showing the essential neolithic economy of the culture. About eighty per cent of microliths include parallel-sided ribbon-blades and asymmetrical flakes, associated with parallel-fluted cores. The blades range from 1½ to 5 in. in length and are reminiscent of the ribbon-flakes of the Harappa. There are also examples of flakes with crested ridge. In small numbers are found steeply-blunted and serrated blades, lunates, trapezes, scrapers and worked points. The whole complex is evidently dominated by an essentially-urban blade-industry, without any retouch, the secondary work being always of a steep-blunting nature. No polished stone axe is found; however, the four trap specimens, from the surface, of the pointed-butt axe-type of Brahmagiri can be assigned to this Period, because of the undoubted association of the type with microliths both at Brahmagiri and Sanganakallu. The other specialized stone objects comprise spheroid balls of granite, showing flattened battered sides, indicative of their use as hammer-stones. They are similar to those found at Navdatoli and Brahmagiri in association with painted pottery and microliths.

The pottery of Period I is mainly wheel-made, though hand-made specimens are also present. There are two ceramic phases, the earlier of them characterized by a dull-grey ware, as at Bahal, sometimes mottled, and a pinkish-buff ware, showing a greater frequency at the lower levels. Noteworthy of the latter phase is the painted pottery with linear designs on red slip.

The animal-remains of Period I represent the short-horned humpless and humped varieties (*Bos indicus*) of cattle, buffalo (*Bos bubalus*), sheep (*Ovis vignei*) and goat (*Capra hircus aegagrus*). This is contrary to the assertion of Haimendorf that the neolithic settlers in India kept the pig and fowl but lacked the domesticated cattle.[2]

(ii) *Other sites*

Allchin, in his excavation at Paklihal in Raichur District, found a terracotta figurine representing a long-horned variety of cattle.[3] This is confirmed by Zeuner's identification of the cinder as accumulated heaps of cow-dung from the ash-mounds at Kupgal and Kudatini in Bellary District;[4] this is further supported by the identification of big bones of cattle in the ash-mounds between Gaudur and Machnur near Lingsugur in Raichur District. The domestication of these animals demonstrates a pastoral economy of the settlers, tending towards food-growing.

About fifteen chalcolithic sites in Bijapur District, in a very small area in the Bhima basin, yielded black-on-red painted pottery and a thick grey ware, associated with a

[1] Thapar, *op. cit.*

[2] C. von Fürer-Haimendorf in *Indo-Asian Culture*, II, no. 3, (1954), p. 239.

[3] F. R. Allchin, 'The neolithic stone industry of north Karnatak region', *Bull. School of Oriental and African Studies*, XIX, no. 2 (1957), pp. 321-35.

[4] Subbarao, *op. cit.* (1958), p. 81.

specialized blade-industry and fluted cores; in a few of them neolithic polished axes in trap are also found.[1] It would appear that Hirakal near Bagalkot is also a likely site.[2]

Saletore found a neolithic polished axe in trap, along with microliths and chalcolithic pottery, at Saptasagar in Belgaum District, south-west of Bijapur.[3] With the discovery by Lal and Deshpande of a chalcolithic site with painted pottery and microliths at Karad in Satara District,[4] the Krishna basin becomes closely linked with that of the Godavari as revealed at Nasik-Jorwe and Nevasa, further north.

(iii) *Nagarjunakonda*

At Nagarjunakonda, about 250 miles east of Bellary, lies a neolithic site with polished stone axes in different stages of manufacture, in association with the typical neolithic burnished grey (as at Maski) and reddish brown wares, along with fragments of copper, besides animal-bones.[5] The bones belong to the domesticated buffalo (*Bos bubalus*) and spotted deer (*Axis axis*). The culture seems to be analogous to the corresponding ones at Brahmagiri, Sanganakallu and Maski.

F. The Tungabhadra valley

(i) *Brahmagiri*

The cultural sequence at Brahmagiri, as revealed in the 1947-excavation,[6] is: Period I, a stone-axe culture, represented by a depth of 9 ft., divisible into Sub-periods IA and I B, separated by a sterile weathered surface; Period II, megalithic culture, of 4-ft. deposit; Period III, the Āndhra culture, extending to the surface, of about 3 ft. Period I is characterized by polished pointed-butt axes of trap-rock, the earlier examples of which show a flattened section, though the lenticular section is the normal. The axes are associated with microlithis of jasper, flint, agate, opal and rock-crystal, amongst which the specialized geometric tools, such as the trapezes, triangles and the crescents, were very rare or entirely absent. A copper chisel, found midway down Sub-period IB, and two small rods, one of copper, from inside a burial-urn, and another of bronze, from a middle stratum of Sub-Period I B, indicate both a knowledge and an extreme scarcity of the metal. A bronze finger-ring was found from a late stratum of I B.

The pottery is hand-made, mostly of coarse grey fabric, in both the Sub-Periods of Period I, in contradistinction to the wheel-made pottery of Periods II and III. In the lowest black-soil layer of Sub-period I A occasional sherds of the painted and incised red or buff slipped ware, absent in the upper layers, were found.

The range of patterns on the painted sherds shows curvilinear lines representing a conventionalized plant-pattern, with no resemblance whatsoever, technically or artistically, with the Harappa. The incised sherds represent elementary herring-bone or criss-cross lines. The majority of the sherds in Sub-period I B represent burial-urn pottery, mottled and of dull-grey colour.

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[1] *Indian Archaeology 1957-58*, p. 39.
[2] *Ancient India*, no. 5 (1949), p. 10.
[3] Information from Dr. B. A. Saletore.
[4] *Indian Archaeology 1956-57*, p. 79.
[5] Soundara Rajan, *op. cit.*, pp. 99 ff.
[6] Wheeler, *op. cit.*

The lithic finds from Brahmagiri are mainly confined to Period I. The microlithic industry is crude in the extreme and rarely exhibits any attempt at retouching. While there is a crescent, there are no lunates, trapezes or scrapers, in contrast to the mesolithic industries. The majority of the tools are double-edged blades in jasper without retouch, a few of which have serration on one edge. Finished microliths to the extent of ten per cent were recovered from Sub-period I A, while ninety per cent were recovered from Sub-period I B. Some blades are of the battered-back type. The technique of serration, though known from the earliest level of the site, was not widely applied. The serrated blades show no sign of gloss on the serrated or unserrated edges and are restricted to the lower level of Sub-period I B. There is also a crested-ridge flake.

The exact character of Brahmagiri microlithic industry is hard to determine, as fluted cores, corresponding to the parallel-sided blades, are absent.

Of the stone axes of the pointed-butt type, fifteen complete and twentynine broken specimens were found in Period I, in various stages of chipping, pecking, grinding and polishing (indicating that Brahmagiri had been a factory-site), there being no proof for Haimendorf's typological evolutionary phases, i.e. chipped axes with only the cutting-edge, ground and polished, preceded the axes ground and polished all over.[1] Besides, the presence of cores and flakes of this material mostly in the strata of I A and in the low levels of I B indicates a local industry. Save for one small flat axe with roughly-parallel sides converging abruptly to a pointed butt and three broken axes from I A, the majority of the axes were obtained from the lower levels, with a unique stone adze from the higher levels of Sub-period I B. Again, the axes fall into two groups, one with flattened lenticular section, restricted the lower levels, and the other with ovoid section, present throughout the Period. The other lithic tools in this Period are saddle-querns, rubbers and spheroid balls.

The pig or sheep seems to be the domesticated animal, as indicated by a terracotta figurine found in Sub-period of I B.

(ii) *Sanganakallu*

At Sanganakallu,[2] Subbarao found in Phase II a neolithic industry associated with coarse brown-and-black and pale-grey pottery, along with a superior urban microlithic industry of chert, jasper and quartz. Below this, and separated by a thin barren layer, was found the earliest occupation of the site, Phase I, characterized by heavily-patinated flakes of trap and sandstone associated with a crude microlithic industry of quartz and chert, without any evidence of pottery. The flakes are long and short, exhibiting longitudinal and convergent flaking by the Levallois technique. The microliths are mostly of quartz, without any secondary retouch, fluted cores being very few; on account of the bad material, no definite implement-types can be made out.

The succeeding Phase, II, shows a continuous occupation by the highly-developed neolithic culture, divisible into two Sub-phases on the evidence of associated pottery. The lower Sub-phase has a pale-grey ware along with a few sherds of coarse brown-and-black hand-made pottery, as at Bahal and Maski. In the upper Sub-phase the dominant ware is the brown, and black ware, the pale-grey ware being very much in subordination. A few painted sherds with violet and purple paintings on a dull red slip are also found.

[1] C. von Fürer-Haimendorf, 'The problem of megalithic cultures in middle India', *Man in India*, XXV (1945), pp. 73-86.
[2] Subbarao, *op. cit.* (1948), p. 9.

FIG. 2

Maski: 1, pointed-butt axe, polished all over, with ovoid section; 2, pointed-butt axe, finely polished with flat lenticular section (similar to 6); 3, pointed-butt axe, polished all over with truncated lenticular section; 4, pointed-butt axe, finely polished on cutting-edge and roughly all over surface (similar to 8)

Brahmagiri: 5, pointed-butt axe, small flat, triangular (type A i); 6, small, flat, with roughly parallel sides which abruptly converge to pointed-butt (type A ii); 7, elongated variant of 6 (type A ii a); 8, small, flattened lenticular axe (type A iii); 9, elongated variant of 8 (type A iii a); 10, small lenticular axe (type B i); 11, elongated lenticular axe (type B i a); 12, elongated ovoid axe (type B ii); 13, polished stone adze

Sanganakallu: 14, rechipped axe with polished cutting-edge; 15; unfinished axe in second stage of manufacture; 16, unfinished axe in first stage of manufacture; 17, broken axe with fine polish; 18, polished blade-axe; 19, broken chipped and polished axe; 20, broken butt-end of axe; 21, chipped and ground axe; 22, broken butt-end of a chisel

Bellary region (surface-collection): 23, axe with circular section; 24, axe with semi-rectangular cross-section; 25, axe with circular section; 26, blunted-butt axe; 27, plano-convex axe of 'shoe-last' type; 28, axe-hammer; 29, axe with semi-rectangular body and straight cutting-edge; 30, adze; 31, thin flat celts

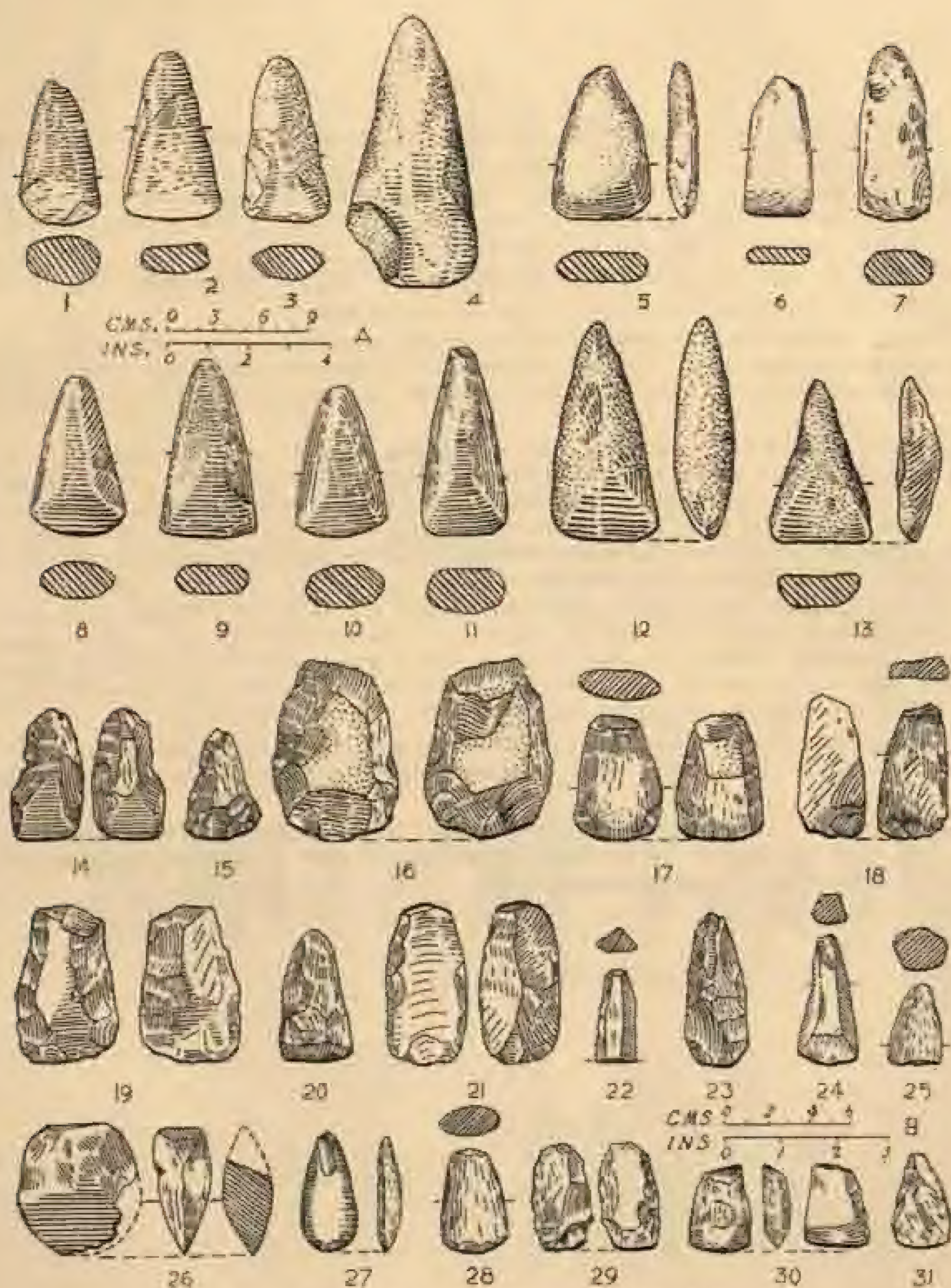


FIG. 2. *Neoliths from Province B—south India*

FIG. 3

Nagda: 1, *parallel-sided blade*; 2, *parallel-sided blade, working-side dentated*; 3, *parallel-sided blade*

Maheswar and Navdatoli: 4, *serrated blade with distinct dentition, serration due to taking away of small deep flakes*; 5, *serrated blade, dentition not clear*; 6, *obliquely-blunted point, but marks along the edge due to use (may be included under blades)*; 7, *trapeze with retouch on transverse, tending towards lunate*; 8 *and* 9, *lunates, blunted by steep retouch along arc*; 10, *side-cum-end-scraper*

Prakash: 11, *parallel-sided blade*; 12, *serrated blade*; 13 *and* 14, *oblique points*

Bahal: 15, *parallel-sided blade*; 16, 17 *and* 18, *oblique points*

Nasik: 19, *fluted core with flattish, truncated base and roughly-conical cap*; 20, *parallel-sided backed blade, sharp but unworked edge*; 21, *trapeze, unretouched edge, back and oblique sides delicately worked*; 22, *lunate, straight unretouched edge, with blunted back*; 23, *lunate, small, straight unretouched edge, steeply-retouched back*

Jorwe: 24, *core, flat faceted platform at one end, fluted on one surface, with ridge on other by cross-flaking, section triangular*; 25, *core fluted on one surface flattened on reverse by delicate 'ripple' or 'serial' flaking, perhaps used or turned into side-scraper*; 26, *crescent-blade or lunate, vertically retouched, leaving chord untouched*; 27, *point on obliquely-retouched blade, elongated and sharpened by series of fine retouches on the oblique part*; 28 *and* 29, *straight, worked back, one-edged blades, unretouched, often-used edge, back also straight, vertically retouched*; 30, *parallel-sided flake without retouch, but with used edge*

Maski: 31, *pointed backed blade, lateral margin blunted by steep secondary retouch*; 32, *crescentic backed blade, lateral margin blunted by steep secondary retouchings in crescentic shape*; 33, *lunate, lateral margin blunted by secondary retouchings, working-end almost fresh*: 34, *trapeze with use-marks on working-edge, transverse sides blunted by steep secondary retouchings*; 35, *long parallel-sided blades, butt-end showing diffused bulb of percussion and a bulbar scar, prepared striking-platform at right angles to the main flake-surface*

Sanganakallu: 36, *lunate, blunted along arc*; 37 *and* 38, *parallel-sided blades blunted on one side by retouch*; 39 *and* 40, *simple blade-flakes without retouch*; 41, *parallel-sided blade blunted by retouch*; 42, *simple blade-flake without retouch*

Brahmagiri: 43, *double-edged blade without retouch*; 44, *double-edged blade without retouch nicked for hafting*; 45, *simple serrated blade*, 46, *bent blade, bent end probably active part of blade*; 47, *blade with battered back*; 48, *beaked graver*; 49, *lunate or crescentic blade*

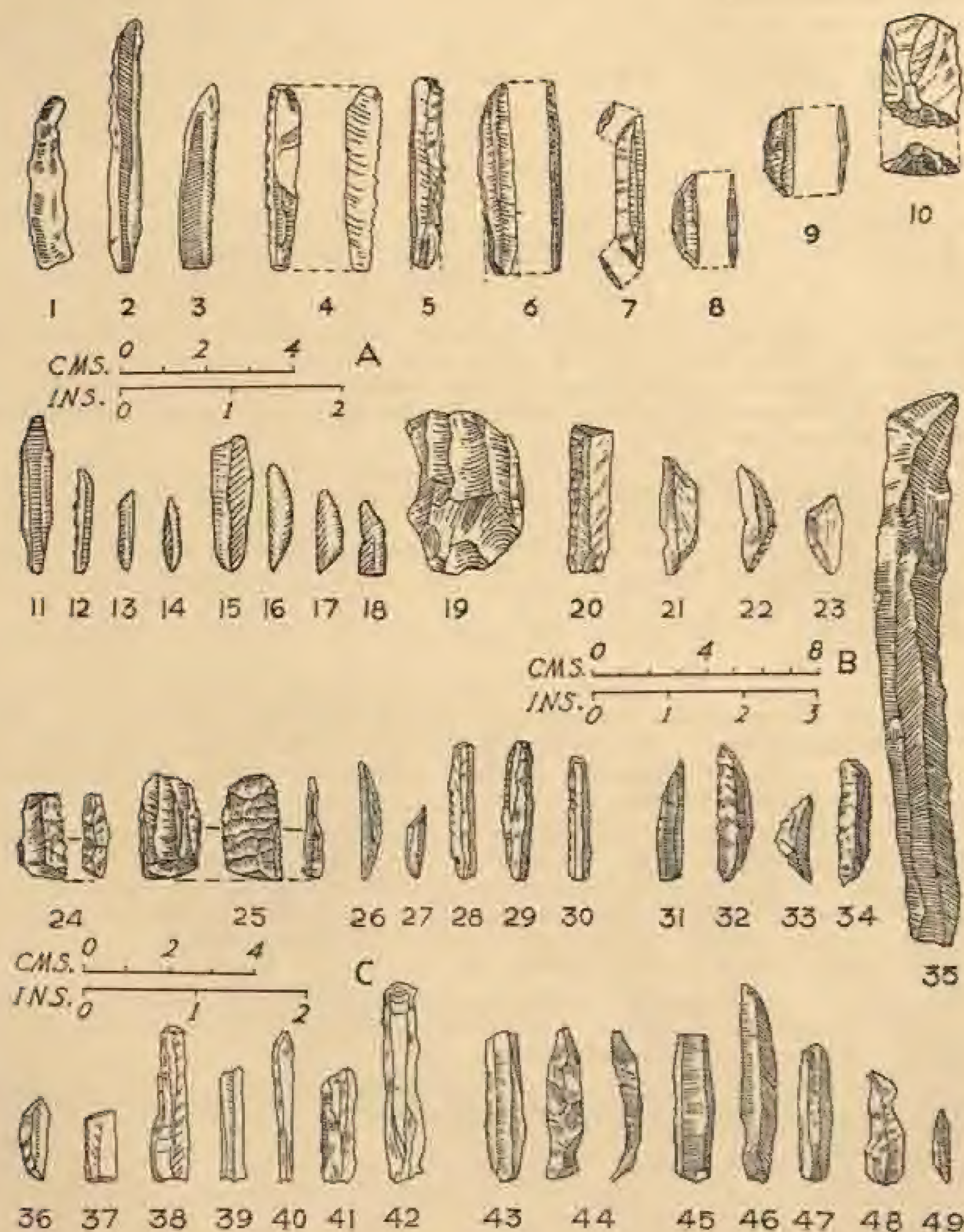


Fig. 3. *Artefacts from Province A—central and western India*

The stone-axe industry of this Phase is highly developed and is closely associated with a rich microlithic industry, which, however, weakens as it approaches the upper Sub-phase. This rich urban microlithic Phase is characterized by parallel-sided blades with steep blunting on one side and blades with serrated edges showing fine polish, with a few lunates. On the basis of the parallel-sided blade-industry, Phase II corresponds to Brahmagiri I, even though the painted pottery makes its appearance at a late stage of this Phase.

G. Relationship and chronology

Despite local variations, the culture of central and western India, nurtured on the black cotton soil, as far down at Brahmagiri, is broadly homogeneous in its contents. At the southern Deccan sites—Brahmagiri, Sanganakallu, Kallur and Maski—it is dominated by a local neolithic industry characterized by the polished stone axe (fig. 2), while in the northern Deccan and central Indian sites—Sojanipur, Nagda, Maheswar, Navdatoli, Bahal, Prakash, Nasik, Jorwe, Nevasa, etc.—it is distinguished by a profusion of painted pottery; however, a microlithic industry of parallel-sided blades and polished axes (fig. 3), as at Nevasa, and burial-urns, as at Bahal and Jorwe, link both these regions, and a two-way traffic is thus discernible.

The tradition of painted pottery, copper-bronze celts and ribbon-flakes of this culture are closely parallelled by those of the Harappan culture in Kathiawad, though in pottery-types the notable correspondence is confined to the dish-on-stand, the handled saucepan and the carinated bowl, which occur in the post-Harappan levels at Rangpur,[1] Lothal[2] and Somnath,[3] Maheswar and Prakash, and to a double-pot obtained from Jorwe, which is analogous to a similar pot from Kot-Diji in Sind.[4] All these serve to underline the links between the Harappa culture and the chalcolithic culture of central and western India.

The most remarkable evidence that links up the central and western Indian chalcolithic sites with the Harappan and post-Harappan sites of Kathiawad is the recurrence of a common flaking-tradition of the parallel-sided blades in the Karnatak, western India and West Pakistan. This is the technique of crested guiding-ridge flaking, the one employed in the mass-production of blades.

The classic site where such flakes and fluted cores are found is Le Grand Presigny in France. The technique is also observed in the Aegean, in Turkey and in the lower Indus region. At Le Grand Presigny this long-blade industry did not reach its zenith until the end of the neolithic times. In the Aegean, at Melos, this industry belongs to the Pre-Mycenaean period. In Turkey it occurs in the middle chalcolithic levels. In the Fertile Crescent it comes from the neolithic levels of Jericho, Jerash and Makertu.[5]

In India, the appearance of this technique at a transitional stage between the Neolithic and Copper-Bronze Ages is significant, as with the emergence of metal tools, the blade had a greater utility than the earlier series of lithic tools.

At Maheswar, the earlier historical phase, Period III, characterized by the black-and-red ware and the Northern Black Polished Ware, together with the punch-marked silver

[1] *Indian Archaeology 1953-54*, p. 7; *ibid., 1954-55*, pp. 11-12.

[2] *Ibid., 1954-55*, p. 12; *1955-56*, pp. 6-7; *1956-57*, pp. 15-16; *1957-58*, pp. 12-13; [Now add: *1958-59* (1959), pp. 13-15; *1959-60*, (1960), pp. 16-19.—Ed.].

[3] *Ibid., 1955-56*, pp. 7-8; *1956-57*, pp. 16-17.

[4] Cf. Thapar, *op. cit.*, p. 21.

[5] Cf. Subbarao, *op. cit.* (1958), p. 94.

coins, can be assigned to *circa* 200 to 400 B.C.[1] On the Brahmagiri evidence, the megalithic black-and-red ware has been dated as *circa* 200 B.C.[2] The protohistoric phases of Brahmagiri are represented by a deposit 9 ft. thick. Wheeler suggested a mean accumulation rate of 3 to 4 ft. of occupation-soil in two centuries, and, at this rate, one obtains a duration of at least six hundred years or 1000 B.C. as the date proposed for the introduction of this culture.

Applying the same scale of computation for the 22-ft. thick chalcolithic deposit at Nagda, the duration works out to 1500 years, more than double of the span arrived at for the Brahmagiri chalcolithic phase, thus going to the beginning of the second millennium B.C. This would probably be in accord with the evidence at Rangpur, as the latest phase there saw the deteriorating Harappan culture transforming itself into one affiliated to the protohistoric culture of central and western India. This span would also account for the evolution of the parallel-sided blade-industry in this region.

At the majority of the sites in central and western India, the dominant parallel-sided blade-industry is accompanied by backed blades with crescents and trapezes of the hunting-type. This would mean the survival of the earlier microlithic phase that merged into the immigrating urban parallel-sided blade-industry of the chalcolithic-neolithic phase. The link is shown by the backed blades, as the steep retouch of these blades is borrowed from the earlier microlithic tradition extant in the geometric tools. It is significant that the blunted-backed blades are completely absent in the proto-neolithic parallel-sided blade-industries and also in the later Harappan and post-Harappan sites in the Indus basin and Kathiawad. In Kathiawad, the crescents in the blade-industry of the late Harappan phase have their chords much longer than their mesolithic counterparts.[3] For this technological change in the parallel-sided blade-industry of central and western India one should presume a longer date for the evolution of this culture, going back probably to 2000 B.C. All these show that the protohistoric culture of the region is an immigrating culture of western origin and is deep-rooted

4. PROVINCE B—SOUTHERN INDIA

A distribution-map depicting the pointed-butt polished axe, characteristic of a Neolithic Age in India, shows the grouping in two clusters, viz., in south India (particularly concentrated in the Karnatak region) and in east India. They are absent in both the coastal regions. From a superficial resemblance of these pointed-butt axes of the two clusters, a north-east to south-west movement has been suggested for the neolithic axe culture. This is further supported by Haimendorf's Munda hypothesis that a late neolithic civilization with eastern affinities, associated with the same form of Austro-Asiatic tongue, permeated the older population of the Deccan.[4] A further correlation is also shown in the affinity of the living megalithic culture of Assam with the Gadabas and Bondos of Orissa and the Marias of Bastar.

The older stratum of the neolithic age of India may, therefore, be represented by the pointed-butt stone axe. Since this type is not uniformly distributed in India but is profuse in the Karnatak and east India, with an intermediate regional gap between the Krishna and the Mahanadi basins, we are led to think in terms of two different neolithic

[1] Sankalia, etc., *op. cit.* (1958), p. 21.
[2] Wheeler, *op. cit.*, pp. 200 ff.
[3] Information from Shri S. R. Rao.
[4] Haimendorf, *op. cit.*

provinces—a southern stone-axe culture concentrated in the Karnatak and an eastern one embracing Orissa, Bihar, Bengal and Assam. Climatically also, these are two different regions: the Karnatak area of the Deccan plateau falls in the arid region in the lee of the Western Ghats, while the eastern area is within the heavy-monsoon zone. Besides, the neolithic sites in both the regions are confined to the plateaux and are found very rarely in the alluvial flats. The reason for the detached distribution of the pointed-butt axes in the eastern half of India appears to be ecological.

A. The Karnatak

The largest surface-collections of neolithic artefacts were made in Bellary District by Bruce Foote, Richards, Knox, Jardine and Gompertz.

Allchin drew up a complete picture of the neolithic industry of the north Karnatak region from a typological study of all the early collections.[1] He made out three basic stone-working techniques—flaking, pecking and grinding—and found that pecking was rarely employed for edge-tools. While it was more common among rubbers and grinders, it was restricted to certain sizes of celts. Similarly, overall grinding was reserved for a few small and well-shaped axes. He pointed out that there was no clear evidence of any evolution in the application of these techniques in this region, for they were known from the earliest neolithic settlements. He said that in all probability they were derived from the neolithic stone-working techniques of the Middle East and Iran. In the range of tools are included axes, adzes, chopping-tools, chisels, wedges, scrapers, points, rubbers and grinders, hammer-stones and mace-heads. On the other hand, Brahmagiri and Sanganakallu show a neolithic axe culture evolving in Bellary from a protoneolithic phase to a highly-developed neolithic phase in stratigraphic sequence and in accordance with the surface-evidence of Allchin. Whether I A of Brahmagiri represents a true neolithic culture remains to be decided. Copper was introduced in such small quantities into this axe culture that it was ineffective in changing the main neolithic culture, economically and technologically. The occurrence of a flat copper celt in the mid-level of I B at Brahmagiri and the unique polished flat axe in stone lower still in I A can only show copying in stone of the copper flat celt already familiar in this Period.

Phases I of Sanganakallu and Pre-I of Brahmagiri (above, pp. 30 and 41) seem to lead to the regular neolithic industry characterized by grinding and polishing of the implements in Karnatak. Since the lower levels of Brahmagiri I and, derivatively, Sanganakallu II B are ascribed to 1000 B.C., the earlier Sub-phase of Phase II and Phase I of Sanganakallu must be far anterior to that date, specially as there is a sterile layer intervening in between.

The Karnatak complex is to be deemed a local industry developed on the soil, as it emanates from a crude post-palaeolithic (microlithic) flake-industry of the hunting-stage when axes were rare. This, in turn, develops into a rich axe-industry, absorbing a dominant parallel-sided blade-industry coming from the protohistoric culture of central and western India. This complex is essentially different from the eastern complex which is devoid of any association with microliths. The origin of the polished axe culture of the Karnatak should not be looked for in the Indus valley or in west Asia and Iran as conjectured by Allchin.[2] The all-eastern origin suggested by Worman on

[1] Allchin, *op. cit.*
[2] *Ibid.*

typological grounds[1] does not also seem to be tenable for the reason that the eastern complex is quite different from that of the southern, which is characterized only by the pointed-butt axe and its variations. The culture should have come on the scene autochthonously round about 2000 B.C.

B. Salem

The next largest collection of polished axes farther south comes from the Shevroy hills in Salem District,[2] where, as in Bellary, there are large dykes of basalt that provided the requisite raw material. A few celts have also been collected from beyond Salem. The total absence of celts in the region south of the Cauvery should be attributed to the rarity of basaltic dykes in that region. A flat stone axe, similar to the one from Brahmagiri I A, reported by Foote in the Shevroy hills may perhaps indicate the extension of the chalcolithic influence as far south as Salem.

5. PROVINCE C—EASTERN INDIA

The east-Indian neolithic complex can be grouped into two regions: Assam and Bengal[3]-Bihar-Orissa. The analysis presented below is mainly based on the systematic study of Dani.[4] Since the classification of neolithic celt-types in India and south-east Asia by Worman[5] is hard to reconcile with actual tools, it is purely of academic and theoretical interest.

A. Assam

The neolithic types of Assam follow a pattern dictated by geographical factors: they can be best studied on a regional basis, as each group of tools of a particular region shows a distant kinship in material and form. The technique of manufacture is common in all this region, though the forms show variation from zone to zone. As the material was obtained generally in the form of flat slabs from stream-beds, very little chipping or flaking was necessary, battering or hammering and grinding or smoothing being sufficient to produce tools.

(i) *The zones*

The tool-types of Assam (fig. 4) fall into six zones.

(a) Sadiya Frontier.—Chief material jadeite; less typological variation than in Cachar hills; main types showing affinity with ground tools from Yunnan, also the nearest source of jadeite.

(b) Naga hills.—Chief material gneiss; varied and distinctive tool-types, which, besides the common types found all over Assam, include the gouge-adze found abundantly

[1] Worman, *op. cit.*

[2] R. B. Foote, *The Foote Collection of Indian Prehistoric and Protohistoric Antiquities: Notes on their Ages and Distribution* (Madras, 1916), p. 57.

[3] In this context 'Bengal' means the region covered by West Bengal (India) and East Pakistan.

[4] Dani, *op. cit.*, p. 41.

[5] Worman, *op. cit.*

FIG. 4

1, shouldered hoe, irregular and broad; 2, shouldered hoe, irregular and long; 3, axe with broad-cutting edge; 4, faceted hoe with long parallel sides; 5, faceted hoe, curvilinear; 6, shouldered hoe, regular and broad; 7, shouldered hoe, regular and long; 8, shouldered hoe with regular with crescent-shaped body; 9, faceted hoe with unifacially-ground edge; 10, gouge-adze; 11, rounded-butt axe, curvilinear; 12, rounded-butt axe with bifacially-ground median edge; 13, splayed axe; 14, tanged axe; 15, faceted hoe with bifacially-ground median edge; 16, rounded-butt axe, unifacially-ground edge-bevelled; 17, wedge-blade; 18, faceted tool, with side-notches

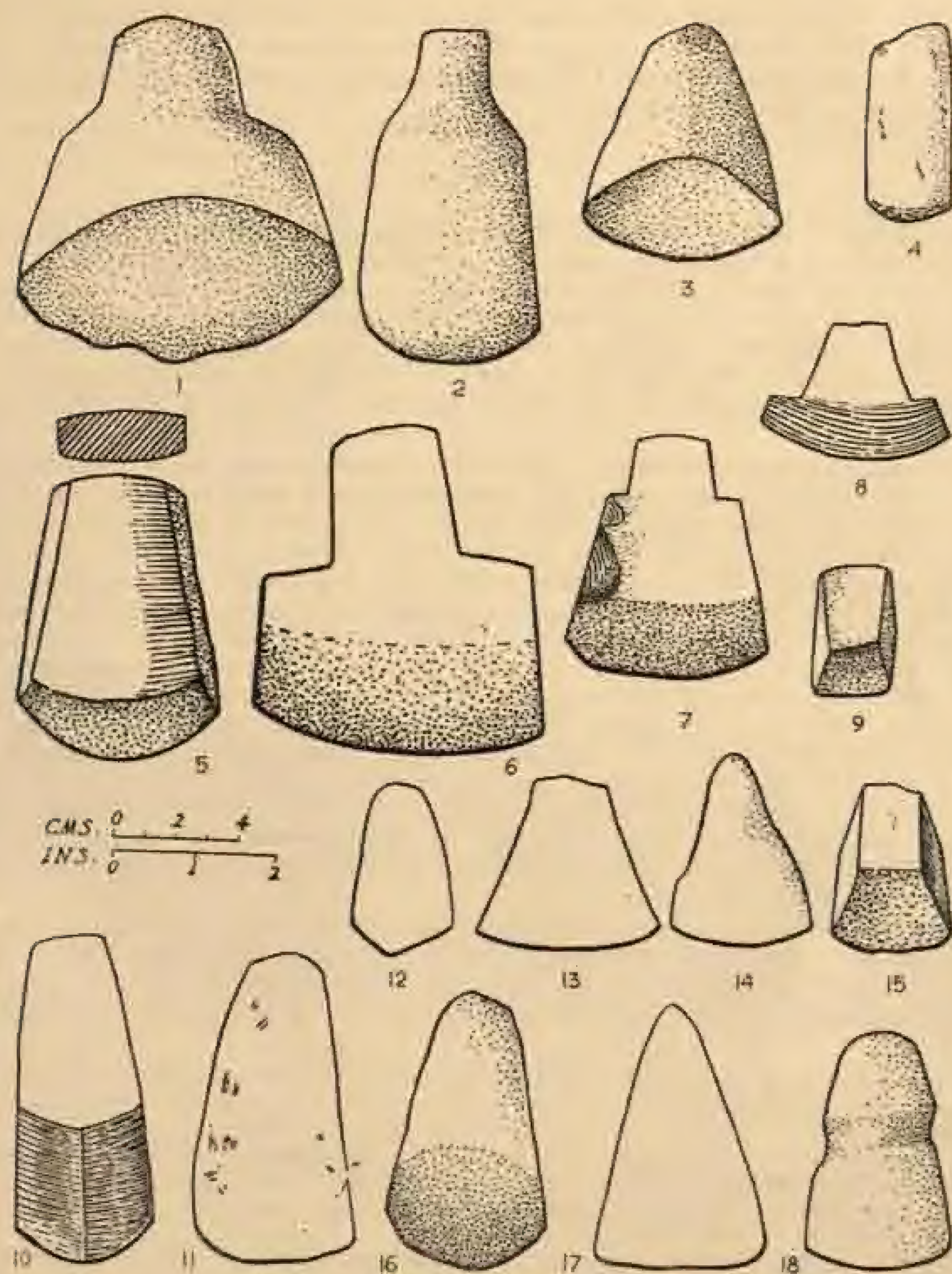


FIG. 4. *Neoliths from Province C—Assam*

in Burma, Malaya, Siam, Laos and Cambodia, along with tanged axe and the wedge-blade, special to this region.[1]

(c)-(e) KHASI, GARO AND CACHAR HILLS.—Most of the types seemingly derived from Cachar hills; remarkably similar to the developed tools of upper Burma.

(f) BRAHMAPUTRA VALLEY.—Material sandstone; tools, mostly from Tezpur District; made of smoothed pebbles.

(ii) *Tool-types*

(i) FACETED HOE.—This is a common tool in Assam, Chittagong, Yunnan and south-east Asia, where it is known as 'quadrangular adze'. It has an oblong cross-section. Three stages are involved in the manufacture: (a) the primary one, for rough-out; (b) the secondary one, for producing the normal hoe; and (c) the tertiary one, for producing the median cutting-edge. Five sub-types, none of them mentioned by Worman, are noted: (a) curvilinear; (b) bifacially-ground median edge; (c) unifacially-ground edge; (d) faceted with side-notches, found only in the Naga hills; and (e) long with parallel sides.

(ii) SHOULDERED HOE (spade-shaped celt).—Similar to the faceted hoe, the main variation here consists in the prolonging of the butt into a tenon for better hafting. In some, corners are right-angled by a process of wire-cutting or sawing; in others, the angle is obtuse or even curved at the junction, both ranging in length from 2½ to 5½ in. The regular rectilinear variety is confined to the Naga and Cachar hills, where it appears to be derived from Burma. The irregular (curvilinear) variety, on the other hand, is restricted to the Brahmaputra valley and the Khasi and Garo hills, where it appears to be the local imitation of the regular (rectilinear) variety. The curvilinear specimens show ovoid transverse sections and the rectilinear ones oblong. Here also five sub-varieties are recognized. While chipping and pecking can be seen in curvilinear ones, the rectilinear ones show high smoothing. The distribution of the shouldered hoe is confined to east India, Burma, Indo-China and other parts of south-east Asia. The rectilinear variety, however, shows a sporadic distribution in India, having been found by Ball in Dhalbhum in Bihar[2] and Baidyapur in Mayurbhanj, by Rivet-Carnac in central India,[3] by Cammiade near the mouth of the Godavari,[4] by Haimendorf in Hyderabad[5] and by Worman in northern Mysore.[6]

(iii) SPLAYED AXE.—Rare in Assam, it is found in only one variety, viz. bifacial median splayed cutting-edge with concave sides terminating in a narrow flat butt, the transverse section being nearly rectangular. The majority of these tools are completely smoothed and highly polished, their lengths varying from 2¾ to 6 in. The distribution is

[1] This is confirmed by Kanti Pakrasi from his study of the collections in University of Gauhati and Assam State Museum, 'A study of some neolithic artefacts from Assam', *Jour. Uni. Gauhati*, VII (1956).

[2] V. Ball, 'On some stone implements of the Barmese type, found in Pargana Dhalbhum; District of Singhbum; Chota-Nagpur Division', *Proc. Asiatic Soc. Bengal*, 1875, pp. 118-20.

[3] H. Rivet-Carnac, 'On stone implements from the North-western Provinces of India', *Jour. Asiatic Soc. Bengal*, LII (1883), no. 1, pp. 221-30.

[4] L. A. Cammiade, 'Pigmy implements from the lower Godavari', *Man in India*, IV (1924), pp. 83-105.

[5] C. von Fürer-Haimendorf, 'Notes on the Stone Age in India', *ibid.*, XXVIII (1948), pp. 197-208.

[6] Worman, *op. cit.*

confined to east India and south-east Asia. The stone examples appear to have been copied from a metal prototype. This is the most highly developed form of all in India, and the distribution definitely indicates that the examples are the most recent arrivals in India from the east.

(iv) ROUNDED-BUTT AXE ('round axe' of Heine-Geldern).—This is long, thin axe, oval to lenticular in section, with rounded butt and convex unifacial cutting-edge. It is found, in different stages of pecking, chipping and smoothing, in the Garo hills and rarely in the Naga hills. Their lengths range from 8 to 9 in.

(v) AXE WTIH BROAD CUTTING-EDGE.—A variant of (iv), the cutting-edge of this type is very broad, and the sides taper very acutely. This corresponds to Pakrasi's new find in the Garo and Sarania hills.

(vi) and (vii) TANGED AXE AND WEDGE-BLADE —They are a distinct group by themselves, found mainly in the Naga hills and also in upper Burma. The former type, with slight shoulders at the butt, is probably influenced by shouldered hoe; they, however, differ from each other in their bifacial cutting-edge and rounded butt-form. A few specimens have been found in Mayurbhanj in Orissa.

(viii) GROOVED HAMMER-STONE.—The type occurs at Bisnath in Tezpur District. It is found in Annam, and a few examples come from China.

Types (i) to (iii)—the faceted hoe, shouldered hoe and splayed axe—have a wide distribution in south-east Asia and south China: the Assam specimens belong to a general complex.

B. BENGAL-BIHAR-ORISSA

The area falls into three zones: (a) Chittagong zone, south of the Khasi, Garo and Naga hills; (b) sub-Himalayan zone; and (c) Chhota-Nagpur Zone.

(a) CHITTAGONG ZONE.—This is culturally related to Assam, since the few tools found here are of the faceted variety of Assam.

(b) SUB-HIMALAYAN ZONE.—Very few tools are found on the hill-terraces and slopes of the higher regions in Darjeeling.[1] They are absent in the plains. The tool-varieties include the faceted tool, rounded-butt axe and wedge-shaped axe, as in Assam, besides the chisel and hammer-stone.

(c) CHHOTA-NAGPUR ZONE.—Luckily many tools have been found in this zone under observed conditions by such workers as Anderson in the valley of Sanjai below the alluvium,[2] Sen in the Sanjai valley and Bamal in Midnapore District,[3] Ray in the terraces of Bongara in Manbhum,[4] Sinha in south Manbhum,[5] Lal at Ban-Asuria, Jashpur, Daspalla and Baidyapur in Orissa,[6] Mukherji at Deulbarh in Midnapore District[7] and Nagar at Musanagar in Kanpur District.[8]

[1] E. H. C. Walsh, 'A note on stone implements found in the Darjeeling District', *Jour. Asiatic Soc. Bengal*, LXXIII (1904), pp. 20-24.

[2] J. Anderson, *A Report on the Expedition to Western Yunnan via Bhamo* (Calcutta, 1871), pp. 410-15.

[3] Sen, *op. cit.*

[4] G. S. Ray, 'Implements of neolithic type from Bongara-Bhanghat in Manbhum', *Man in India*, XXXVI (1956), pp. 49-55.

[5] S. Sinha, 'Some prehistoric stone tools in south Manbhum', *Science and Culture*, October, 1951.

[6] Lal, *op. cit.*, p. 97.

[7] *Indian Archaeology 1955-56*, p. 69.

[8] *Ibid.*

Fig. 5

Bengal: 3, *rounded-butt axe*; 4, *shouldered celt*; 8, *smoothly-ground triangular celt with sharp and straight bevelled cutting-edge*; 9, *small oval ground celt with deeply-convex cutting-edge*

Bihar: 1, *bar-chisel, rough-chipped, unground*; 2, *chisel, cutting-edge unifacially ground*; 5, *chipped axe, broad convex cutting-edge*; 6, *wedge-shaped axe with broad ground cutting-edge and flat butt*; 7, *'screw-driver' chisel, obliquely- and sharply-bevelled cutting-edge, margins of sides converging at both ends*; 10, *rounded-butt axe, bifacially ground, median cutting-edge, with blunt or thick butt-end*; 11, *rounded butt-axe, broad ground cutting-edge*; 12, *broken axe, triangular or sub-triangular, chipped, often ground on body, working-end missing*; 13, *rectangular chisel with flat butt, chipped and ground, sharp straight cutting-edge*; 14, *axe, ground and polished, asymmetrically convex cutting-edge with rectangular cross-section*; 15, *axe, elongated oval, completely chipped, straight cutting-edge with flat lenticular cross-section*; 16, *partially-chipped and polished celt with sharp axe-like appearance*; 17, *short and stout chisel, rectangular, ground and smoothed, oblique and bevelled cutting-edge*; 18, *axe, chipped, ground and polished, polishing found mostly on cutting-edge, convex cutting-edge*; 19, *grooved hammer-stone, finely polished*; 20, *grooved hammer stone, crude*; 21, *rounded butt-axe, with rounded butt somewhat pointed*; 22, *partially-ground and polished chisel unifacial, polishing restricted only to cutting-edge*; 23, *polished celt with convex cutting-edge*; 24, *polished celt, triangular in shape with convex cutting-edge*

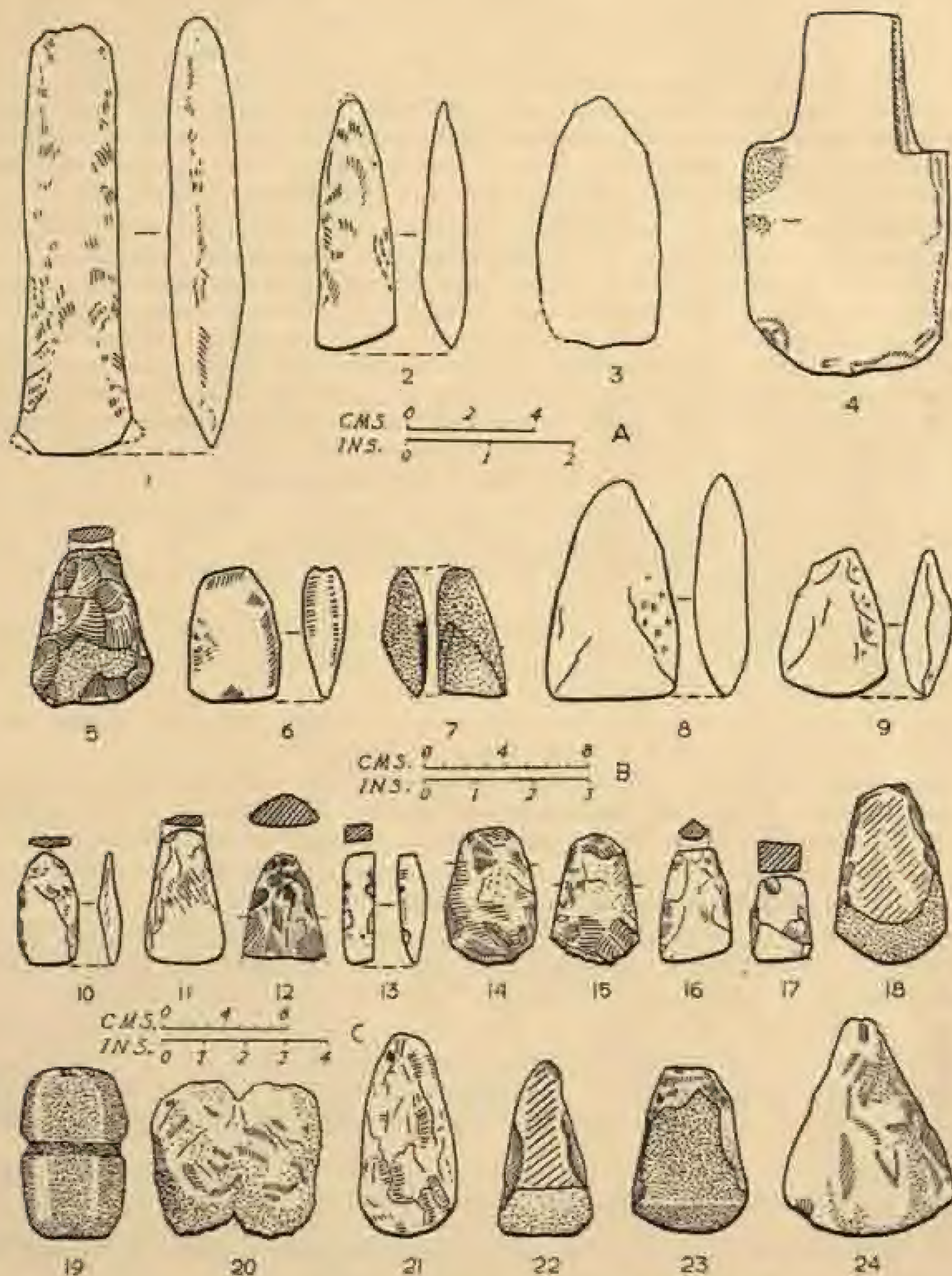


FIG. 5. *Neoliths from Province C—Bengal-Bihar-Orissa*

There appears to be a chalcolithic facies in the neolithic complex of this region. In southern Bihar the majority of the microlithic sites are associated with the copper belt, which starts 5 miles north of Chakradharpur and runs through Kharsawan and Seraikela across Dhalbhum through the Rakha mines to Ghatsila on the Subarnarekha.[1] Gordon says that heaps of copper slag and microliths lie in close proximity and that the presence of microlithic sites from Chakradharpur to Ghatsila, including Talsa, Banabassa and Rakha mines, coincides so closely with the copper seam that it is difficult to suppose that they were not anciently associated. The pointed-butt axes found at Talsa and Chandaburu on the copper seam are probably part of a chalcolithic-neolithic culture.

Sen and Ray found a non-geometric parallel-sided blade industry in the Sanjai valley adjoining a neolithic site at Chakradharpur and Bongara in Manbhum.[2] A few blades show the blunted back and curved back. There are a few geometric shapes, like the lunate, semi-lunate and trapeze, and fluted cores. Though there is no pottery or copper tool or slag associated with these microliths, the appearance of ribbon-flake blades, reminiscent of the Harappan tradition, side by side with the earlier hunting-types, commonly seen in the Singrauli basin near Mirzapur[3] or in the microlithic site of Birbhanpur in West Bengal,[4] would still point to some connexion with the protohistoric phase of western and central India. Can the Tripurī industry (above, p. 37) be considered as a link connecting western India and the Chhota-Nagpur plateau?

The following types (fig. 5) are represented in the zone: (i) axe; (ii) wedge; (iii) chisel; (iv) perforated tool; (v) shouldered hoe; and (vi) hammer-stone. Three different techniques—chipping, pecking or hammering and grinding—have been used, either singly or in combination, to produce these tools.

(i) *Axe.*—Rounded butt, with median cutting-edge bifacially ground and the transverse section ovoid or lenticular. Predominant tool in Singhbhum and Manbhum; also found in Assam and in Kaimur and Banda.

(ii) *Wedge.*—Variant of the axe, the main difference being the pointed butt-end chipped transversely and ground, producing a flat butt.

(iii) *Chisel.*—Generally rectangular in cross-section with flat butt; cutting-edge (occasionally splayed) bifacially and unifacially ground. Reported by Sen in Singhbhum in Bihar and found by Mitra in the excavation at Jaugada in southern Orissa.[5]

(iv) *Perforated tool.*—Circular or oval flat stones with a hole in the centre; worked from both faces; hardly any grinding, edges blunt.

(v) *Shouldered hoe.*—Found at Deulbarh in Midnapore District, Bongara in Manbhum District, Dhalbhum in Singhbhum District and Mayurbhanj, as also in Assam, central India, at the mouth of the Godavari, Hyderabad and northern Mysore.

(vi) *Hammer-stone.*—Generally an elongated pebble hardly showing any working. A number of grooved hammer-stones are found in the Kaimur hills.[6]

A few other types come from the surface-collections of Bodding, Ray and others. The 'bar-chisel' is one such, reported by Lal at Ban-Asuria, Jashpur, Thakurani,

[1] Gordon, *op. cit.*

[2] G. S. Ray, 'Microlithic industry of Bongara—Manbhum', *Man in India*, XXXIV (1954), pp. 16-19.

[3] V. D. Krishnaswami and K. V. Soundara Rajan, 'Stone Age industries of Singrauli basin', *Ancient India*, no. 7 (1951), pp. 40-65.

[4] B. B. Lal, 'The microlithic industry of Birbhanpur', *ibid.*, no. 14 (1958), pp. 4-49.

[5] *Indian Archaeology 1956-57*, p. 30

[6] Coggin Brown, *Catalogue of Prehistoric Antiquities in the Indian Museum* (Calcutta, 1917), p. 78.

Sitabhanji and Daspalla in Orissa[1] and in the Santal Parganas in Bihar. It bears close similarity to the Malayan types, with the main difference that the latter are ground. There are miniature faceted tools in jadeite from Lohardaga near Ranchi,[2]—a type not found on the mainland of south-east Asia but occurring in large numbers in the river-valley cultures of northern China and Yunnan. From Santal Parganas comes a thin-sectioned broad axe, which is abundantly met with in the Garo hills in Assam. Sen found a chisel of the 'screw-driver' type, unique in India, in Singhbhum.

The faceted tool, the shouldered hoe and splayed axe, so common in south-east Asia, came to India much later, as they are found sporadically without any archaeological context. The occurrence of the shouldered hoe inside the fortifications of Kauśāmbī and at Sisupalgarh and Rajgir is highly suggestive of a fairly late intrusion. In Assam, these types are notably in evidence, and they slowly immigrated from the neighbouring countries into the hilly regions of eastern India, where they were integrated with the indigenous industry. This is, to a certain extent, corroborated by the absence of these types in the first group of neolithic types of the Bengal-Bihar-Orissa, specially characterized by the rounded-butt axe simulating the pointed-butt axes of peninsular India. The sporadic distribution of these specialized tools in India further suggests that they may be regarded as imports, or, at best, as local imitations of foreign types, instead of being the products of a separate and distinct cultural grouping in India.

C. Relationship and chronology

In eastern India and all over south-east Asia (fig. 6), two different tool-traditions persisted side by side, unaffected by any microlithic (mesolithic) influence, in contrast to Provinces A and B. The first tradition of predominantly chipped and flaked stone tools—reminiscent of the palaeolithic—was the earlier one, uniformly distributed all over this heavy-monsoon region. Further, edge-grinding was a consistent feature of the flaked and chipped tools in south-east Asia, wherein we can see an intermingling of the two traditions in the Hoabinhian and Bacsonian in Indo-China[3] and Kelantan in Malaya.[4] This was the main cultural tradition of the early eastern neolithic, prior to the appearance of an independent second tradition belonging to the later neolithic, using predominantly ground, sawn and fully-smoothed tools.

The second tradition gains in importance as we proceed eastward from Chhota-Nagpur to Indo-China through Assam and Burma. The focus of this culture can be located in Malaya and Indo-China. Further, this tradition of grinding and sawing tools is associated with pottery in south-east Asia, suggesting an intrusion from outside. The later Somrongsen culture of the Indo-China indicates a link with the Hong Kong culture of south-east China and shows similarities with the Malayan.[5]

Laos, Yunnan and Burma show typological similarities to Somrong Sen and Malayan cultures; yet there are differences. The shouldered hoe and gouge-adzes are absent in Yunann, but they link Laos and Burma with Malaya and Siam.

[1] Lal, *op. cit.* (1953).
[2] Dani, *op. cit.*
[3] E. Patte, 'l'Indochine prehistorique', *Rev. Anthropologie*, 46th year (Paris, 1936), pp. 277-314.
[4] Tweedie, *op. cit.;* Colani, *op. cit.*
[5] For Indo-China, *see* H. Mansuny, *Stations prehistorique de Somrong Sen et de Lang-Prao (Cambodge)* (Hanoi, 1902); also his papers in *l'Anthropologie*, XX (1909), pp. 531-43; *Mem. Serv. Geol. Indo-Chine*, 10, fasc. 1 (1923); *ibid.*, 11, fasc. 2 (1924); *ibid.*, 12, fasc. 1 (1925); and *ibid.*, 12, fasc. 2 (1925); also Mansuny and M. Colani, in *ibid.*, 12, fasc. 3 (1925).

Fig. 6

Hoa-Binh: *1, scraper with secondary retouch; 2, ground tool ; 3, chopping tool; 4, coarse handaxe; 5, ground handaxe; 6, ' haches courtes '*

Bac-Son: *7, handaxe; 8, chopper (unique); 9, shouldered hoe, showing sawing-technique; 10, faceted tool, showing sawing-technique*

Burma: *11 and 12, socketed shouldered hoes; 13, rectangular shouldered hoe*

Malaya: *14 and 15, flat celts, bifacially ground, with splayed cutting-edge; 16, long chisel (bar-celt) with splayed cutting-edge, unifacially ground; 17, chisel, bifacially ground, with splayed cutting-edge; 18, long shouldered hoe; 19, flat celt, with convex cutting-edge; 20, flat celt, unifacially ground*



Fig. 6. *Neoliths from south-east Asia*

In south-east Asia, there is a distinct grouping of tools in the later phase; a single type of tool, such as the shouldered hoe, cannot be torn of its context and attributed to the Austro-Asiatics, speaking the Mon-Khmer group of languages. One variety of the chisel, viz. bar-chisel or adze, is particularly characteristic of the late tool-types of Malaya. Noone has suggested[1] that these might have been used as plough-shares, especially as they are often found 'unfinished', i.e., flaked but not ground. They recur only in eastern India—in the hilly tracts of southern Bihar, West Bengal and northern Orissa—in the same complex as they are found in Malaya. On this evidence, a maritime communication seems likely. In the copper-hoard site of Gungeria in Madhya Pradesh and in the Ganga basin, the bar-celt, the shouldered hoe, the splayed axe and the long rectangular chisel are found together.[2] They appear to have been copied from stone celts of similar shapes occurring in this region. There is, therefore, good reason to believe that the copper-hoard complex developed from their prototypes in stone in quick succession when metal began to replace stone. In the Ganga basin, Lal observed an ill-fired thick ochre-coloured pottery as a likely associate of the copper tools, and if it is to be equated with that at Hastināpura lying below the Painted Grey Ware,[3] it follows that the copper hoards of the Ganga basin could be pre-Aryan, assignable to about 1500 B.C.

The earliest evidence of the shouldered hoe in bronze comes from Anyang in Hupei, from the burials of the Yin dynasty[4] (1300 to 1026 B.C.). A few stone specimens outside the graves come from Honan, and from this cultural area of China comes the faceted square-cut axe which has been obtained from a context where metal was in use. The infiltration of this northern Chinese culture into the southern countries is evident in Szechwan and Fukien. There is no doubt that it penetrated further south, into south-east Asia, where it is recognized as the developed neolithic culture. It follows that the appearance of metallic tradition in south-east Asia can hardly be earlier than the one at Anyang. On the other hand, the evidence from Hong Kong, Somrongsen and Malaya indicates a date somewhere about the second half of the first millennium B.C. for its existence in these regions. The persistence of this tradition even when iron and bronze were introduced is known from Malaya and Indo-China. At Kelantan in Malaya, the later group of ground tools with pottery lay under a complex in which Chinese glazed ware was found. A clue is given by the find of a few sherds of a typical highly-polished black ware (said to be 'Greek or Attic') in the upper levels of the Kelantan sequence, dated between the fourth to second centuries B.C.[5] Dani says that its date may even come down to the first or second century A.D., if it is of the same type found at Arikamedu in India.[6]

The shouldered type of hoe has been found at Kauśāmbī and Rajgir, where the North Black Polished Ware is coeval with it; the highly-polished black ware of the Kelantan sequence may be re-examined in this light. At Jaugada in southern Orissa, Mitra found a stone axe in a sandy layer, seemingly associated with black-and-red ware.[7] The neolithic industry of the place is characterized by a rounded-butt axe with a straight cutting-edge and two rectangular chisels with quadrangular section—mostly surface-finds. The seeming association of eastern neolithic type of axes with black-and-red ware at Jaugada

[1] H. D. Noone, 'Report on a new neolithic site in Ulu-Kelantan', *Jour. Federated Malaya States Museum*, XV, no. 4 (1939), pp. 170-74.

[2] B. B. Lal, 'Further copper hoards from the Gangetic basin and a review of the problem', *Ancient India*, no. 7 (1951), pp. 20-39.

[3] Lal in *Ancient India*, nos. 10 and 11 (1954 and 1955).

[4] Dani, *op. cit.*, p. 226.

[5] M.W.F. Tweedie and Sieveking in *Illustrated London News* (London), 5th March, 1955, p. 407.

[6] Dani, *op. cit.*, p. 211.

[7] See above, p. 48, n. 5.

has been confirmed at Sonpur in Bihar. The types of axes are a tiny celt, a rounded-butt type with thin lenticular section and a rectangular adze with quadrangular section. The find of a neolithic axe at Vaiśālī by Krishna Deva and Mishra can also be attributed to the period of the N.B.P. Ware.[1] Thus, in eastern India, we have an association of the black-and-red ware and the N.B.P. Ware with the late neolithic complex of south-east Asia; this phase persisted even after iron and punch-marked coins were introduced. This is comparable with Malaya and Indo-China.

6. PROVINCE D—KASHMIR

Outside the Deccan and eastern India and unconnected with either, we have a neolithic site at Burzahom in Kashmir, where the pointed-butt axes with hand-made buff and grey ware found by De Terra in a post-glacial loess, 9 ft. deep. This industry was succeeded by the post-Harappan Jhangar culture, characterized by a black polished ware and sherds with incised geometric design.[2]

Can it be that the neolithic phase of Kile II of Kile Gul Mohammed in Baluchistan, assigned to the fourth millennium B.C., inspired the loessic neolithic industry of Kashmir? Between Baluchistan and Kashmir, the only neolithic pointed-butt axe comes from a site on the banks of the Indus opposite Shadipur near Attock. The rest of the celts, found at Harappa and Mohenjo-daro and at Nal in Baluchistan, definitely occur in Metal Age levels. Thus, the north-Indian culture can be much earlier than the Karnatak culture and is apparently not influenced by the eastern Indian culture.

7. EPILOGUE

Summing up the facts stated above, we have in India a neolithic pattern showing four Provinces—A, B, C and D. Province A is chalcolithic in character and is restricted to western Madhya Pradesh and western India, co-extensive with the Deccan Trap region. This complex is characterized by parallel-sided ribbon-flake blades, painted pottery and copper artefacts of post-Harappan facies of western origin. As it comes closer to the Karnatak region in the south, it absorbs the polished stone axes of the second Province, B, spread all over the south. The urban parallel-blade industry is further galvanized by the earlier hunting-type of microliths, characterized by the lunates and trapezes with steep retouch, which was changing itself into the neolithic—as we see in Gujarat. This galvanization has become very patent in the blunted-backed blades that persist side by side with ribbon-flakes. It is interesting to note that such an impact did not take place in the later Harappan sites of Kathiawad, just outside Province A.

Province B is centred in the Karnatak in south India, away from the Deccan Trap region. It is characterized by the pointed-butt type of axe, which apparently originated in the region itself. In its earlier phase, it is related to the post-palaeolithic flaking-technique, arising in a microlithic milieu. Later, it absorbed the post-Harappan ribbon-flake, painted pottery and copper celt traits of Province A.

Province C is restricted to east India, where we see three phases overlapping each other. The earliest phase is of the rounded-butt axe, showing chipping, grinding and

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[1] Information from Shri Krishna Deva and Shri Vijayakanta Mishra.

[2] [See above, p. 28, n. 3, and p. 34, n. 5. The present excavation at Burzahom has not in any way confirmed what was said by De Terra about the stratification of the site or about its pottery.—Ed.]

polishing. It does not show any relationship with the pre-existing microlithic culture of the region, unlike the Karnatak and central and western India. The second phase is characterized by faceted and square-cut tools involving a metallic technique of manufacture. The origin of the second two phases has to be located in the south-east Asia—in Indo-China and Malaya, where they are found in real archaeological complexes. The first phase shows a very great antiquity in south-east Asia; the rounded-butt type of axe has spread uniformly from that region to Chhota-Nagpur. The second phase, characterized by faceted square-cut tools, shows an irregular distribution in eastern India. In Assam we have the faceted tools of Malaya along with the shouldered hoe. In Bengal-Bihar-Orissa, the faceted type of tool is absent, but the shouldered hoe, the bar-celt and the rectangular chisel with quadrangular section are similar to those of Malaya, thus showing a maritime influence. This phase was closely followed by the third, with its copper hoards of the Ganga basin and Gungeria, which exhibit, in metal, the same type of tools as in stone (including the bar-celt) found in Chhota-Nagpur. This phase seems to have come as a second wave round about fourth century B.C., when the Northern Black Polished Ware and black-and-red ware were well-established in India. Province C has not materially affected Province B except for the sporadic distribution of the regular shouldered hoe at a few places in the later.

Province D had a distinct culture, probably to be traced to Baluchistan.

The picture I have outlined above is largely speculative, and the most that I hope for is that it will ultimately stimulate discussion. But one thing is clear: without being unduly influenced by a *mirage orientale* for the neolithic origin of India, we have evolved our own neolithic pattern of India, influenced partly by a west-Asian neolithic culture, by the Harappa culture and by the south-east Asian neolithic culture, the rest of autochthonous origin. Further excavations in the four different regions, especially in east India, will make us understand better the new pattern that is beginning to appear as a result of the brilliant work done in recent years.

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NEOLITHIC PATTERN OF INDIA
SCALE OF MILES
AFGHANISTAN
USSR
PAKISTAN
CHINA
BIHAR
WEST BENGAL
ORISSA
ASSAM
BURMA
ARABIAN SEA
BAY OF BENGAL
CEYLON
REFERENCE
MAP OF EURASIA
SHOWING THE MAIN CENTRES OF THE CRESTED-RIDGE FLAKING AND RIBBON-BLADE INDUSTRY
FINLAND
EUROPE
AFRICA

It would appear from the history of structural activities, coupled with epigraphs,[1] that different sects made this picturesque valley their happy abode. Inscriptions affirm the existence of at least four sects, viz. Mahāvihāra-vāsin, Mahī-śāsaka, Bahuśrutīya and Apara-mahāvina-seliya; the last one, being the most dominant sect, has left behind it a number of records to vouch its superior status. There might have been other sects or groups of dissenters, but their names are not available. It is obvious from the inscription in the Chula-Dhammagiri-vihāra that monks and nuns from distant lands frequented the valley; it is but natural that they would bring in their trail new ideas, new constructional innovations, new approaches to the translation of ideas into architectural entities. Notwithstanding the ideological instability of the time and the import of ideas from outside,



FIG. 1

the general outlook and the monastic set-up did not reflect any sign of radical or sudden change. The adjustment to the new condition might have been a gradual and often imperceptible process. It is worth noting that the general trend of Nagarjunakonda sculpture is to represent Buddha both symbolically as well as anthropomorphically. In

[1] For Buddhist inscriptions of Nagarjunakonda, see J. Ph. Vogel in *Epigraphia Indica*, XX (1929-30), pp. 1-37, and XXI (1931-32), pp. 61-71; D. C. Sircar in *ibid.*, XXXIII (1959-61), pp. 247-50.


NAGARJUNAKONDA
SHOWING
BUDDHIST SITES
MODERN VILLAGE
ROAD
HEIGHTS ABOVE 400 FT.
HEIGHTS BELOW 400 FT.
BUDDHIST SITES
RIVER KRISHNA
NAGARJUNA HILL
FORT WALL
CITADEL
PHIRANGIMOTU
PULLAREDDIGUDEM
TO MACHERLA
PUTLAGUDEM
LAMBADIGUDEM
EDDANAMOTU
METRES
YARDS
PLAN SHOWING NAGARJUNAKONDA
AND ITS NEIGHBOURHOOD
MILES
MANI & SASTRY

Fig. 2

some panels such forms occur side by side, which may be taken to be the characteristic of the transitional phase. There must have been also some sites where Buddha was depicted only symbolically (below p. 84).

In the absence of inscriptions the vast majority of the Buddhist structural complexes are not attributable to any sect. The amazing fact is that so many self-contained units came into existence within a short span of about a hundred years. At the same time, it is hard to decide whether ideological beliefs had any influence on the lay-out or in the arrangement of monastic units in all cases. The present study attempts to trace, as far as evidence is available, a doctrinal imprint on the development of Buddhist architecture of Nagarjunakonda, besides classifying monasteries and *stūpas* from the point of view of their development.

This paper starts with the simple hypothesis that the architecture of a monastery would generally be influenced or conditioned by the doctrine and philosophical predisposition of a particular sect. For example, a school which did not believe in the worship of Buddha could by no means have a *chaitya-griha* for enshrining a Buddha-image. Similarly, a monastery with a *chaitya-griha* to house an image of Buddha would speak of a definite worship of Buddha in the human form by its inhabitants.

2. SECTS MENTIONED IN EPIGRAPHS AND THEIR ESTABLISHMENTS

It has been stated above (p. 66) that the most dominant sect of Nagarjunakonda was the Apara-mahāvina-seliyas. At least two monasteries, Sites 1 and 9, can definitely be ascribed to this sect; the former included the earliest and largest *mahāchaitya* (pl. XLVIII), constructed in the sixth regnal year of Vīrapurushadatta, who was the son and successor of Chāṁtamūla, the founder of the Ikshvāku dynasty. The *stūpa*, 91 ft. in diameter, consisted of three concentric circles connected with each other by cross and radiating walls and an *āyaka*-platform at each cardinal direction. It may be inferred from inscriptions[1] that at first only the *mahāchaitya* was built and the monastery was added in the fifteenth regnal year of the same king. In his eighteenth year came into being a *chaitya-griha* enshrining a *stūpa*.

The other monastery, Site 9 (pls. XXXVI A and XLVIII), was definitely renovated, if not constructed, in the eighth regnal year of Ehuvala Chāṁtamūla, the son of Vīrapurushadatta.[2] It was a self-sufficient unit, with more than one phase, having a *mahāchaitya*, two *chaitya-grihas* and a three-winged monastery. A rubble *stūpa* with a *vihāra*, built on earthfast poles, belonged to the earliest phase. But the *chaitya-griha* to set up a Buddha-image and two votive *stūpas* in front of the other apsidal shrine were important accretions not encountered in the earlier monastery of the Apara-mahāvina-seliyas (Site 1). This may indicate that this sect started its career in the valley at a time when the worship of the Buddha-image was not in its tenets; the main object of worship was the *mahāchaitya*, the *stūpa* enshrined in the *chaitya-griha* being secondary. The original sect living in Site 1 thus did not accept the idea of image-worship till the end. On the other hand,

[1] All the epigraphs inscribed on the *āyaka*-pillars bear an identical date, viz., the tenth day of the sixth rainy season of the sixth regnal year of Vīrapurushadatta. It is, therefore, likely that that day witnessed the consecration of this gigantic *stūpa*, which does not appear to have had any earlier nucleus. *Nava-kaṁma*, mentioned in the inscriptions, may mean 'new construction', not 'reconstruction', *Ep. Ind.*, XX, p. 30. The Chula-Dhammagiri inscription states: *imaṁ nava-kaṁmaṁ timhi navaka*[*ṁ*]-*mikehi kāritaṁ*. It is difficult to believe that a class of masons did only renovation. Cf. *Chullavagga*, VI, 5, 2 and 3, Sacred Books of the East, XX (1885), pp. 190-91.

[2] *Indian Archaeology 1957-58—A Review* (1958), pp. 8-9.



Site 9, stūpa with monastery in background. See pp. 68 and 78.



Site 14, stūpa with four-spoked base. See p. 71

To face p. 68



Site 38, Mahāvihāra-vāsin monastery. See pp. 69 and 71



Site 38, inscribed Buddha-pāda. See p. 69

To face pl. XXXVIII



Site 5, Bahuśrutīya monastery. See pp. 69, 73 and 78



Site 5, Bahuśrutīya monastery, oblong shrine and circular chamber. See p. 69

To face pl. XXXVII



Site 54, stūpa and monastery. See p. 71



Site 27, stūpa with four-spoked base but without āyaka-platform. See pp. 71 and 80



Site 24, monastery with chaitya-griha in front. *See p. 73*



Site 26, double chaitya-griha enshrining stūpa. *See p. 73*

To face pl. XXXIX



Site 85, monastery with oblong and apsidal Buddha-shrines. *See p. 73*



Site 85, stūpa with eight-spoked base. *See p. 73*

the Buddha-image did find place in the other monastery, Site 9. Thus, it may safely be concluded that the Apara-mahāvina-seliyas of Nagarjunakonda became divided into two sub-sects.

The monastery situated on the Chula-Dhaṁmagiri, Site 43 (pl. XLVIII), may be attributed to the Theravādin monks of Ceylon. Here, in the fourteenth regnal year of Vīrapurushadatta a female lay-worshipper from Govagāma, Bodhiśrī by name, built a *chaitya-gṛiha* with a *stūpa*—the first of its kind in the ancient city of Vijayapurī. The main *stūpa* of the site, with a circular rim made of brick, had a solid rubble-core, without spokes or *āyaka*-platforms. This sect did not possibly yield to the idea of the worship of Buddha in the beginning; nor did they follow the tradition of the construction of *stūpas* with wheel-base and *āyaka*-platforms. But at a later stage even an oblong shrine with a pedestal, evidently for an image, was added inside the residential enclosure.

Another Ceylonese sect, the Mahāvihāra-vāsin, established a monastery, Site 38 (pls. XXXVII A and XLVIII), as is known from the undated inscription on a Buddha-pāda found here.[1] The construction of the main *stūpa* of this monastery was on the lines of those at Site 43: it was of brick but without any *āyaka*-platform and was further not wheel-shaped on plan. In a later phase the monastery was embellished with a *chaitya-gṛiha*, but it is not certain whether this apsidal shrine was meant for an image of Buddha or for the worship of the Buddha-pāda (pl. XXXVII B), which was discovered at the site itself. A number of votive *stūpas* around the main *stūpa* came into existence in a still subsequent phase. Thus, the Mahāvihāra-vāsins launched upon their career like the orthodox Theravādins but gradually assimilated the idea of constructing votive *stūpas* and also possibly of Buddha-worship. This monastery therefore differs from the Chula-Dhaṁmagiri-vihāra in the existence of a votive *stūpa* and the absence of an apsidal structure enshrining a *stūpa*. These two sites were not identical in their general plan too: Site 38 had a *stūpa* as well as a *chaitya-gṛiha*, situated within the residential enclosure. It is not easy to ascribe the Chula-Dhaṁmagiri-vihāra to the Mahāvihāra-vāsins; some other Ceylonese sect was possibly responsible for its construction.

The monastery of the Mahīśāsakas, Site 7-8 (pl. XLVIII), was built by the sister of Ehuvala Chāṁtamūla and queen of Vanavāsi in the eleventh regnal year of Ehuvala. Vanavāsi was one of the main centres of the Mahīśāsaka sect,[2] which ideologically was nearer the Theravādins than the Mahāsāṅghikas. This monastery had two large *stūpas* but no *chaitya-gṛiha*. It is, therefore, evident that this sect was averse to *chaitya-gṛihas*, not to speak of image-worship. One of the *stūpas* at the site was wheel-shaped, and both had *āyaka*-platforms

The second regnal year of Ehuvala Chāṁtamūla saw the construction of another monastery, Site 5 (pls. XXXVIII A and XLVIII) for the *āchāryas* of the Bahuśrutīya sect, which had branched off from the Mahāsāṅghikas and, as scholars believe, attempted a syncretism of Hīnayāna and Mahāyāna thoughts. In this monastery there were two *chaitya-gṛihas*, both of them meant for enshrining *stūpas* but not Buddhas. At a slightly later date, at least one oblong shrine (pl. XXXVIII B) with a decorated pillar in front, simulating a *dhvaja-stambha*, came into existence within the residential part of the monastery. The pillar portrays the figure of a seated Buddha.

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[1]*Ep. Ind.*, XXXIII (1960), p. 249. The editors of the inscription are inclined to interpret the word *mahāvihāra-vāsin* as 'the residents of the *mahāvihāra*' attached to the Great Stūpa (Site 1). But that *mahāvihāra* definitely belonged to the Apara-mahāvina-seliyas. Moreover, Site 38, where the foot-print slab was discovered, was more than a mile away from Site 1.

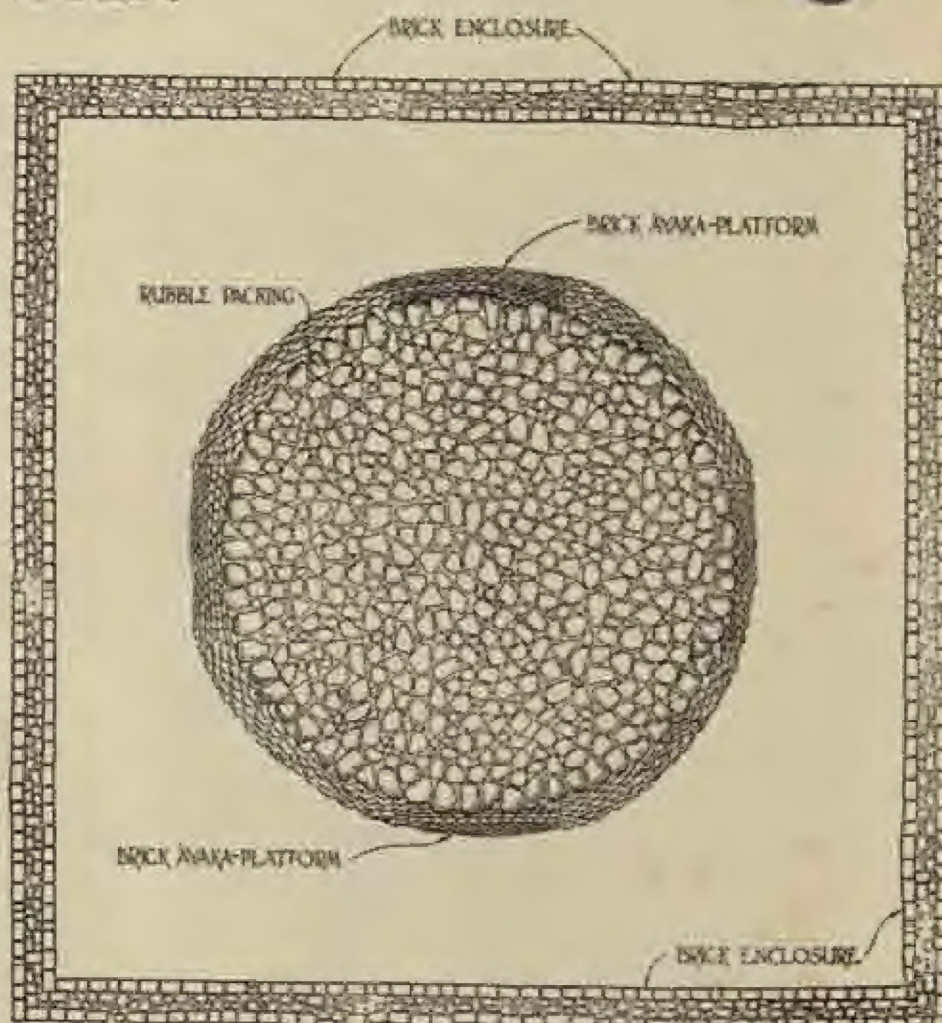
[2]Dutt, *op. cit.* p. 114.

NAGARJUNAKONDA 1954-60

SITE 20

STŪPA





SCALE OF FEET
METRES

FIG. 3

It is apparent from the foregoing that the sects did not have identical types of establishments and that ideological differences manifested themselves in monastic architecture. It is definite that the Apara-mahāvina-seliyas did not originally own the idea of worship of Buddha-image. Even the *chaitya-griha* was adopted by them at a slightly later stage. But within a short period of two decades or so, one of their branches came to accept not only the *chaitya-griha* but also the idea of the worship of Buddha and the erection of votive *stūpas*. The Mahīśāsakas resisted these innovations down to their last days in the valley. The Bahuśrutīyas subscribed to the conception of *chaitya-griha* from the very beginning and raised two identical structures each enshrining a *stūpa*. The worship of the Buddha-image was not originally practised by them, but their subsequent history shows that they also fell in line with the Apara-mahāvina-seliyas.

All these three sects built *stūpas* with *āyaka*-platforms. But the Ceylonese sects did not adopt this constructional feature at all: their *stūpas* had solid bases and were without *āyakas*. The sect which had its monastery on the Chula-Dhammagiri also submitted to the popular demand of image-worship. The Mahāvihāra-vāsins too were swayed by this new current, but in the *stūpa*-construction both of them stuck to the older style. One point needs emphasis: many sects started their careers in the valley without the Buddha-image, but most of them succumbed to the idea after a period of resistance or hesitation. This change was effected within a maximum period of a century.

3. CLASSIFICATION OF THE ESTABLISHMENTS

Broadly speaking, the Buddhist establishments of Nagarjunakonda (fig. 2) may be divided into the five groups.

A. Unit consisting of stūpa and monastery.—The sites under this group, Sites 6, 7-8, 14, 15, 20, 21, 27, 30, 32 A, 32 B, 54 and 86 and the early phases of a few others (pl. XLVIII), may further be divided into two sub-groups of monasteries, viz. (i) those having a *stūpa* with *āyaka*-platforms and (ii) those having a *stūpa* without *āyaka*-platform. Sites 6, 7-8, 14[1] (pl. XXXVI B), 20 (fig. 3), 21, 30, 32A, 54 (pl. XXXIX A) and 86 were associated with *stūpas* having *āyaka*-platforms at the four cardinal directions. None of them, except Sites 7-8, 14 and 54, had a central hall or pillared *mandapa*. The second sub-group is represented by Sites 15, 27 (fig. 4; pl. XXXIX B) and 32 B. Similarly, the early phase of Site 1 would fall under sub-group (i) and those of Sites 38 (pl. XXXVII A) and 43 under sub-group (ii); in all of them the *chaitya-griha* was absent in the early phase.

The simple monastic unit at Nagarjunakonda therefore consisted only of a *stūpa* and a monastery, though there is hardly any reason to assume that such a unit would invariably suggest a chronological priority. It is fairly certain that sects responsible for these units did not uphold the worship of Buddha or the construction of a *chaitya-griha*, all importance being laid on the *stūpa* or *chaitya* itself. It is significant that at least two units of sub-group (ii), viz. Sites 38 and 43, belonged, according to inscriptions, to sects of Theravādin affiliation; hence it is not unlikely that the other three units of this sub-group, viz. Sites 15, 27 and 32 B, where there are no inscriptions, also belonged to such sects. The units of sub-group (i) obviously belonged to the other catholic sects not averse to innovations. The Mahīśāsakas, who were the authors of Site 7-8, did not yield to the idea of either image-worship or *chaitya-griha* and preferred two large *stūpas* instead.

[1]This site had an earlier phase, represented by extant remains of another *stūpa* without any *āyaka*-platform.

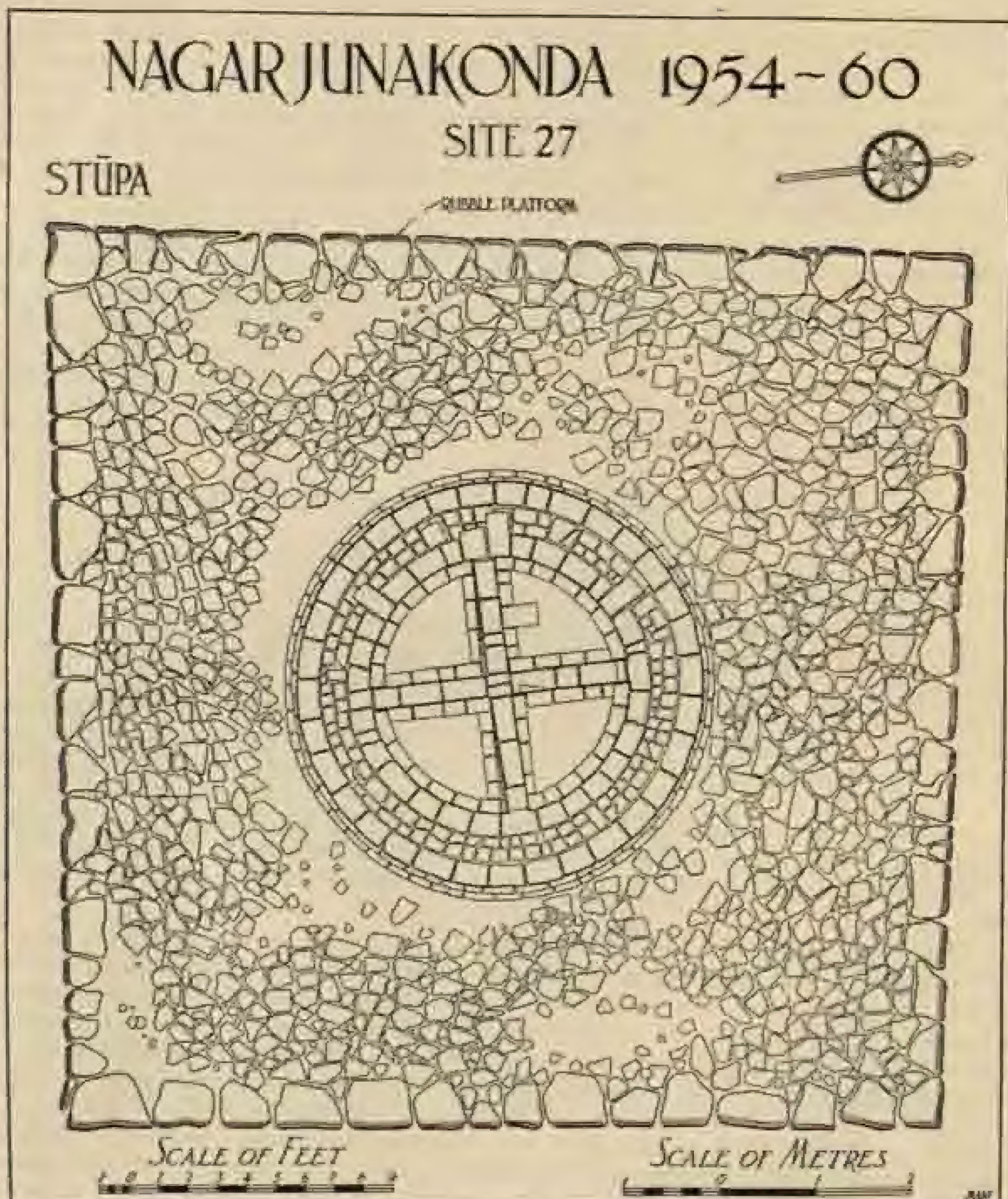

NAGARJUNAKONDA 1954-60
SITE 27
STŪPA
RUBBLE PLATFORM
SCALE OF FEET
SCALE OF METRES

FIG. 4

B. UNIT CONSISTING OF STŪPA, MONASTERY AND CHAITYA-GRIHA WITH STŪPA.—This group is represented by only eight establishments (pl. XLVIII), viz. Sites 1 (later phase), 5 (pl. XXXVIII A), 23, 24 (pl. XL A), 26 (pl. XL B), 28, 43 (later phase) and 108[1] (fig. 5). The *stūpas* inside the *chaitya-gṛihas*, as far as they could be reconstructed, had generally a cylindrical drum surmounted by a low hemisphere—a type reminiscent of the west-Indian caves. Sites 5 and 26 had each two *chaitya-gṛihas*, the former belonged to the Bahuśrutīyas, and comparable with it in many respects was Site 26. Besides the double *chaitya-gṛihas*, both the complexes had within the monastic enclosure chambers externally circular and internally square. It is difficult to be certain, in the absence of any inscription, as to whether Site 26 also belonged to the Bahuśrutīyas. If this affiliation is correct, the presence of a double *chaitya-gṛiha*, each enclosing a *stūpa*, may be taken as the characteristic of this sect at a particular period of its history.[2]

Each of the other sites in this group had only one apsidal temple. Site 24 revealed an inscription of Rudrapurushadatta, the son of Ehuvala Chāṁtamūla and the last known Ikshvāku ruler; it was engraved on a pillar erected in front of the *chaitya-gṛiha* in memory of his mother Vaṁmabhaṭa during his eleventh regnal year.[3] The apsidal shrine at Site 23 was raised within the *vihāra*-enclosure and had a rubble *stūpa* with *āyaka*-platforms. Here the *chaitya-gṛiha* was more conspicuous than the *stūpa* itself. On the basis of the style of the *stūpa*-construction the site may be attributed to some Theravādin sect.

The other monasteries of this group are not much dissimilar to the Apara-mahāvina-seliya units. A paved circular structure inside the monastery, the only one of its kind in the valley, was discovered at Site 24. The presence of a *pūrṇa-kumbha* on either side of the entrance to the structure may point to its use as a shrine, though no image was found near by.

C. UNIT CONSISTING OF STŪPA, MONASTERY AND CHAITYA-GRIHA WITH BUDDHA-IMAGE.—There are eight monasteries under this group, Sites, 2, 3, 4, 9, 38 (late phase), 85, 105 and 106 (pl. XLVIII). Of them Site 85 (pl. XLI) had a double shrine for the image, whereas in other cases only one of the two *chaitya-gṛihas* enshrined the Buddha-icon, the other one being meant for a *stūpa*. The *chaitya-gṛihas* of Sites 38, 105 and 106 were later accretions. Site 105 (pl. XLII A) had an oblong chamber with an image of Buddha in the courtyard of the monastery proper. The apsidal structure of Site 106 was possibly added in the twentyfourth year of Ehuvala Chāṁtamūla.[4] The fact that these Buddha-shrines were constructed at a later date may indicate the mounting pressure of some popular opinion, to which the different sects had to give way. The available data show that it was the Apara-mahāvina-seliyas who first yielded to this new ideology, being possibly followed by the Mahāvihāra-vāsins or some other Theravādin sects and the Bahuśrutīyas. So far as epigraphical evidence goes, the earliest monastery having a *chaitya-gṛiha* with Buddha-image is dated in the eighth year of Ehuvala Chāṁtamūla and it was an Apara-mahāvina-seliya monastery (Site 9). Sites 2, 3 (pl. XLIII A), 4 (pl. XLIII B) and 9 were compact and well-planned units—the *Buddha-chaitya* invariably facing

[1]It is difficult to judge from the extant remains whether the *chaitya-gṛiha* of Site 108 was meant for a Buddha-image or a *stūpa*, but in the absence of any icon it has been included provisionally in this group.

[2]Ramatirtham, in Visakhapatnam District, also has a double *chaitya-gṛiha* each with a *stūpa*. A third one, also with *stūpa*, is possibly a later addition. As the present condition of the site indicates, the main *stūpa* is without any *āyaka*.

[3]*Indian Archaeology 1955-56—A Review* (1956), pp. 23-24.

[4]*Ibid. 1956-57* (1957), pp. 36-37.

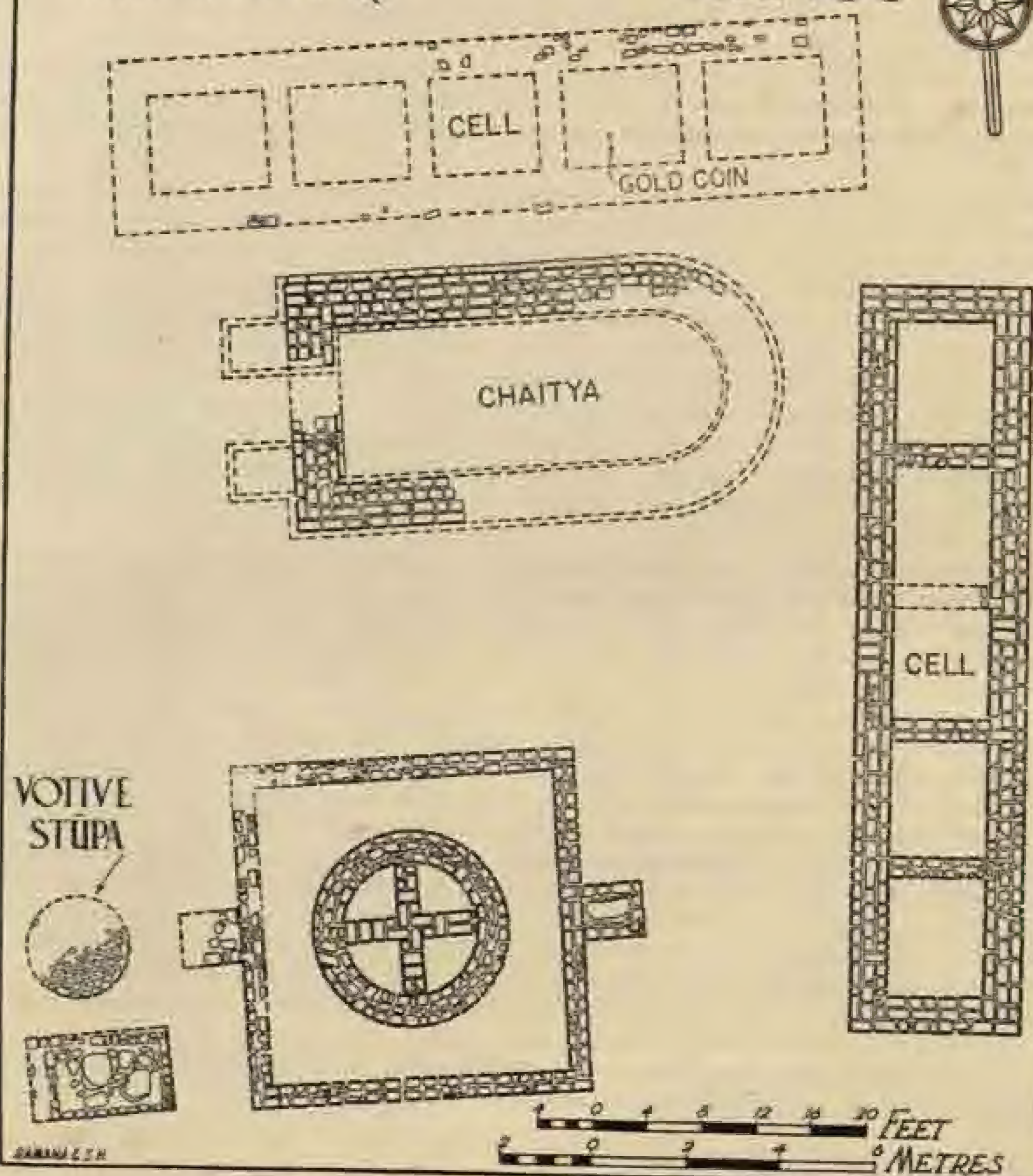

NAGARJUNAKONDA 1954-60
MONASTERY
SITE 108
CELL
GOLD COIN
CHAITYA
CELL
VOTIVE
STŪPA
FEET
METRES

Fig. 5

the *stūpa-chaitya*. They were store-houses of beautiful sculptures, executed in bold relief as well as in the round. The sect inhabiting these monasteries perhaps arrived at a reasonable synthesis that attracted the popular imagination and support. It succeeded in assimilating and harmonizing all the prevalent plastic and architectural innovations, thereby transforming the monasteries into galleries of art and architecture. Such establishments were invariably three-winged and had eight-spoked *stūpas*. Sculptures herefrom generally portray Buddha in human form, though aniconic representations are also not wanting.

The tide of image-worship that swayed the Nagarjunakonda valley during the reign of Ehuvala Chāṁtamūla reached its zenith when the monastery of Site 85 was renovated. Two shrine-chambers, one apsidal and the other oblong, were constructed, both for installing Buddha. The only other site that had a separate oblong Buddha-shrine was Site 105; that is distinct from the enshrinement of Buddha in an oblong cell attached to the monastery proper in Sites 5, 15, 32 A and 43. It is, therefore, evident that the Buddhists of Nagarjunakonda began without a *chaitya-gṛiha* and the image of Buddha, but eventually the popular urge for the Buddha-icon triumphed over the more orthodox schools of thought and established shrines of Buddha as an indispensable adjunct of a monastery.

D. Unit consisting of monastery and chaitya-griha.—There is only one structure under this group, viz. Site 51 (pls. XLII B and XLVIII), which had no *stūpa*. This may tend to show that unlike most establishments no importance was attached here to the adoration of the *stūpa*.

Site 51 revealed a well-preserved *chaitya-gṛiha* enshrining a *stūpa*, near which was brought to light the extant remains of a monastery, ruthlessly damaged by ploughing. There was no attached *maṇḍapa* or central *stūpa*. Thus, these remains may reveal a line of evolution in a different direction. In Site 23 (above, p. 73) the *chaitya-gṛiha* was given greater prominence than the *stūpa* itself.

The peculiar complex in Site 78 may be mentioned in this connexion. Here there were two apsidal structures placed side by side, with two monasteries to the left. A group of subsidiary structures in the shape of oblong, circular, square and octagonal bases existed around the pillared *maṇḍapa* in front of the *chaitya-gṛihas*. The present writer is inclined to regard these structures as bases of miniature *stūpas*.[1] One of them had clearly a circular outline on the square pedestal. It is significant to recall that the *stūpas* of north-west India were generally raised on a square platform. Octagonal bases for *stūpas* enshrined in the *chaitya-gṛiha* may also be observed in the Dharmarājikā complex at Taxila.[2] Some of the *stūpas* in the Bagh caves in central India also have octagonal bases.[3]

The earliest apsidal temple of Nagarjunakonda was built by Bodhiśrī in the fourteenth regnal year of Vīrapurushadatta (above, p. 69). Bodhiśrī, it is learnt from an inscription, was also responsible for the construction of another *chaitya-gṛiha* in the Kuḷahaka-vihāra, which must have been situated within this valley itself. It was possibly she who introduced at Nagarjunakonda the idea of *chaitya-gṛiha* as an adjunct to the Buddhist establishment. Karla, the stronghold of the Mahāsāṅghikas, and other west-Indian caves might have inspired certain architectural devices of Nagarjunakonda. The apsidal shrine became common both to the Brāhmaṇical and Buddhist architecture during Ikshvāku rule.

[1] The absence of a large *stūpa* at the site has led some to believe that the complex was Brāhmaṇical in character, but it need not necessarily be so. The cave-temples of west India are examples where large *stūpas* are absent, the emphasis being on the apsidal shrine with small *stūpas*.

[2] John Marshall, *Taxila* (Cambridge, 1951), III, pl. 45.

[3] John Marshall and others, *The Bagh Caves in the Gwalior State* (London, 1927), pl. 1.

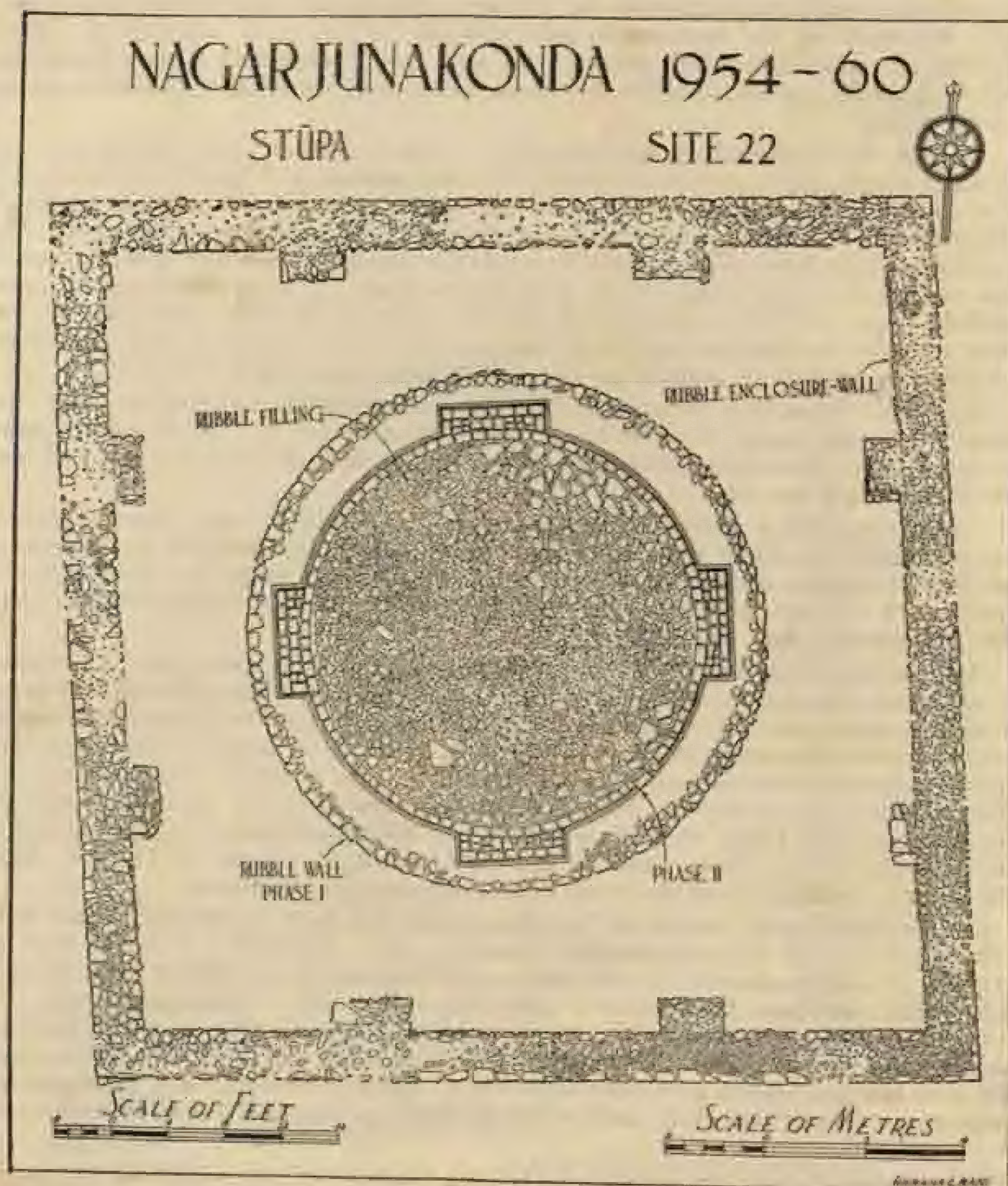

NAGARJUNAKONDA 1954-60
STŪPA
SITE 22
RUBBLE FILLING
RUBBLE ENCLOSURE-WALL
RUBBLE WALL
PHASE I
PHASE II
SCALE OF FEET
SCALE OF METRES

FIG. 6

E. Isolated Stūpas.—Five examples of *stūpas*, Sites 15 A, 16, 22, 52 and 59 (pl. XLVIII), possibly *uddeśika* in nature, unconnected with any monastery, etc., have come to light at Nagarjunakonda. All save Site 15 A had *āyaka*-platforms in four directions. Site 16 (pl. XLIV A) had the only specimen of a *stūpa* with a ten-spoked base. The *stūpa* of Site 52 was four-spoked on plan, but Site 59 (pl. XLV B) revealed a unique feature in the use of the *swastika* as an inset in the centre of the *stūpa*. Site 15 A had a circular rubble *stūpa* on a hillock without any *āyaka*. The *stūpa* of Site 22 (fig. 6) must have had more than one phase. In its earliest form it had a rim made of rubble, the interior being more or less hollow. In the next phase a brick-built rim with projections in four directions was constructed within the diameter of the circular rubble structure. The presence of *āyaka*-platforms in the second phase may help one in identifying it as a *stūpa*, but the core remained unpacked even in this period.

4. THE VOTIVE *STŪPAS*

The inclusion of votive *stūpas* in the monastic establishments of Nagarjunakonda may have some bearing on the changing outlook of the Buddhists residing in the valley. The earliest monasteries did not possess any such *stūpa*, but those of Sites 2, 6, 9, 15, 23, 38, 106, 108 and possibly 26 (pl. XLVIII) had them. Out of these eight sites, only two, Sites 9 and 106, yielded datable inscriptions. The *chaitya-gṛiha* of Site 9 was flanked on each of the two sides by a miniature *stūpa*, which, however, did not show any *āyaka*-platform or wheel-shaped base. It may reasonably be surmised that the construction of minor *stūpas* was introduced in the early years of Ehuvala Chāṁtamūla's rule, because Site 9 was renovated in his eighth regnal year. By his twentyfourth year the practice of the construction of minor *stūpas* must have become established, since the monastery of Site 106 built in that year contained as many as eleven votive *stūpas*, four of them arranged at four corners of the main *stūpa*.

Site 6 yielded four votive *stūpas* of different sizes inside a separate oblong enclosure, one of them with a wheel-base. Site 23 too had four votive *stūpas* inside a similar enclosure. The Mahāvihāra-vāsins accepted this idea at a later date: two votive *stūpas* came into existence during the third structural phase of their monastery in Site 38.

All these votive *stūpas*, with rare exceptions, had a solid core and did not have any *āyaka*-platform, save the solitary example of Site 2.

The conception of the votive *stūpa* is intimately connected with the position of the laity in the Buddhist church. There is no doubt that in this period the commoners, including the merchants, promoted the construction of Buddhist buildings to a considerable extent: thus Bodhiśri, a lay-worshipper, was responsible for many a building, Kumāranandin, a *śreshṭhin*, donated a sculptured frieze in the monastery of Site 106 and the renovation of the second Apara-mahāvina-seliya monastery at Site 9 was effected by gifts received largely from the merchant-community. The fruits expected out of such gifts were '(i) religious merits, for himself, his relatives and friends resulting in their happiness in this world and the next (*ubhaya-loka-hita-sukh-āvahanāya*) and (ii) *nivāna-sampati* (*nirvāṇa*-dom) for himself or herself'.[1] This is in consonance with the doctrines of the Chaityaka sect, which possibly prescribed such gifts to popularize Buddhism amongst the laity. It is but natural that the common people would try to acquire religious merit by donating miniature *stūpas*. During the earlier phase donations were given in the monastery either for its construction or for extensions. But a period must have come when no

[1] Dutt, *op. cit.*, p. 106.

additions to the existing establishments were feasible or needed, and it was during this period that the idea of donating miniature *stūpas* might have come to stay.

5. THE *STŪPAS*

The majority of the *stūpas* of Nagarjunakonda had wheel-shaped bases with *āyaka*-platforms at the four cardinal directions. These features are generally considered to be typical of the Andhra *stūpa*-architecture. But this is not wholly correct, because Nagarjunakonda disclosed *stūpas* without wheel-bases and *āyaka*-platforms as well, though *stūpas* with these features may be characteristic of a particular sect, perhaps the most dominant one. Practically all the *stūpas* of Salihundam, District Srikakulam, are without *āyakas*, which are absent at Ramatirtham also.

Most of the *stūpas* of Nagarjunakonda were built of brick, rubble accounting for only six. The *stūpa* of Site 43 had, however, a brick-built rim around an interior packed with rubble and earth. The rubble *stūpas* here were invariably without spokes, but the *stūpas* of Sites 20 (fig. 3), 23 and 28 had *āyaka*-platforms. A rubble *stūpa* with a wheel-base is noticed in the large *stūpa* at Kodavali, District East Godavari; it is built on a terraced platform with a solid hub and two concentric circles.

The introduction of a wheel-shaped plan for the larger *stūpas* was motivated mainly by considerations of structural stability and economy of material. A small *stūpa* of either brick or rubble does not require so much attention so far as stability and economy are concerned. There is also a possibility that this developed constructional feature might have drawn its inspiration from the *dharma-chakra* symbol. Hence, in wheel-shaped *stūpas* one may not only notice an improvement over an earlier building-tradition but also a successful attempt at transforming an idea, a symbol, into an architectural entity. It is difficult to assign the credit of this innovation to any particular sect. The fact that the Chaityakas formed a distinct school of their own in Andhra-deśa[1] may faintly suggest that they possibly specialized in this developed mode of *stūpa*-construction.

That ideology sometimes influenced the form of the *stūpa* is also evident from the *stūpas* with *svastika*-inset in the centre. Nagarjunakonda had three such examples, viz. the *stūpas* of Sites 20 (pl. XLV A), 59 and possibly 108 (fig. 5). These *svastikas*, being in the centre of the base, were obviously not visible from outside. Since such an arrangement cannot have any architectural significance, it may definitely be said that they were due to some ideological consideration. The only other *stūpa* outside Nagarjunakonda reported to have a *svastika* symbol was at Peddaganjam, District Guntur,[2] where largest *stūpa* had a number of bricks in the form of a *svastika*. That Buddha is also shown in the form of a *svastika* may easily be gathered from the sculptural representations of Amaravati and Nagarjunakonda (pl. XLVI). Thus considered, the wheel-shaped plan also might have been motivated by some ideological concept harmonized with architectural requirements. But it will also be apparent from the following discussions that the number of spokes in a *stūpa* was generally connected with its size.

The earliest *stūpa* at Nagarjunakonda, Site 1, was, as already stated (above, p. 68), wheel-shaped on plan. There were eight examples of eight-spoked, six of four-spoked, two of six-spoked and one of ten-spoked *stūpas*. The first circle of the *stūpas* of Sites 5 (pl. XXXVIII A) and 9 (pl. XXXVI A) had eight spokes, but the number of cross-walls connecting this with the outer concentric circle was twelve and sixteen respectively. On

[1] The Chaityakas were so called on account of their devotion to the *chaitya*, Dutt, *op. cit.*, p. 51.
[2] A Rea, *South Indian Buddhist Antiquities* (Madras, 1894), p. 3. See, however, below, p. 81, n. 2.



Site 105, square shrine with mutilated Buddha-image. *See p. 73*



Site 51, chaitya-griha. *See p. 75*

To face p. 78



Site 3, monastery with stūpa in background. *See p. 73*



Site 4, monastery with stūpa on platform in background. *See p. 73*

To face pl. XLIV



Site 16, stūpa with ten-spoked base. *See p. 77*



Site 30, stūpa with six-spoked base. *See p. 80*

To face pl. XLIII



Site 20, rubble stūpa with svastika-base. *See p. 78*



Site 59, stūpa with svastika-base. *See p. 77*

To face pl. XLVI



Site 1, drum-slab representing Buddha symbolically. *See pp. 78 and 84*

To face pl. XLV



Site 6, drum-slab representing decorated stūpa. *See pp. 81 and 84*

the basis of diameter the *stūpas* may be divided into six groups, viz., (i) below 20 ft., (ii) between 20 and 30 ft., (iii) between 30 and 40 ft., (iv) between 40 and 50 ft., (v) between 50 and 60 ft. and (vi) 91 ft. The first group is represented by seven examples—Sites 15, 15 A, 27, 38, 59, 86 and 108,—of which two definitely belonged to the four-spoked variety; of the rest, one had *svastika*-inset and the other four were without spokes. The maximum concentration is in group (ii), represented by thirteen examples—Sites 4, 14, 22, 23, 26, 30, 32, 32 A, 32 B, 43, 52, 54 and 105. Only two *stūpas*—Sites 4 and 26—in this group had eight spokes; all the four four-spoked and two six-spoked ones, besides, five spokeless rubble *stūpas*, belong to this diameter-group. Eight *stūpas*—Sites 2, 3, 7, 8, 20, 24, 85 and 106, six of them being eight-spoked, may be included in group (iii). Only three *stūpas*—Sites 5, 9 and 16—fall in group (iv). There are two examples,—Sites 6 and 21—in group (v) and the last group is represented by a solitary *stūpa*—Site 1.

The position is summarized in the sub-joined table.

TABLE SHOWING THE RELATION OF DIAMETERS OF *STŪPAS* WITH THE NUMBER OF SPOKES

Number of spokes	*Site*	*Range of diameter*
Four	14	20 to 30 ft.
	27	,, ,,
	52	,, ,,
	54	,, ,,
	105	,, ,,
	108	,, ,,
Six	30	20 to 30 ft.
	32 A	,, ,,
Eight	4	20 to 30 ft.
	26	,, ,,
	2	30 to 40 ft.
	3	,, ,,
	7	,, ,,
	24	,, ,,
	85	,, ,,
	106	,, ,,
	6	50 to 60 ft.
	21	,, ,,
Ten	16	40 to 50 ft.
Eight in the inner circle and twelve in the outer ..	5	40 to 50 ft.
Eight in the inner circle and sixteen in the outer ..	9	40 to 50 ft.
Eight in the innermost circle and sixteen each in the central and outermost . ..	1	91 ft.

It will be seen from the Table that four-spoked *stūpas* conform to three different diameters, viz., 27 ft. (Site 14), 22 ft. (Sites 52, 54 and 105) and 15 ft. (Sites 27 and 108). Hence, it may safely be concluded that no four-spoked *stupa* had a diameter of more than 28 ft. The width of the *āyaka*-platform in these *stūpas* varied between 1 ft. 6 in. to 1 ft. 11 in. This narrow width could hardly provide space for *āyaka*-pillars. One peculiar feature of the four-spoked *stūpas* is the general absence of the Buddha-shrine in the establishments containing them. Such a shrine no doubt occurred at Site 105 but it was definitely an afterthought. The *stūpas* of Sites 27 (pl. XXXIX B) and 108 (fig. 5) did not show any *āyaka*-platform; furthermore, no hub could be seen in the centre, whereas in all other cases it was either square or circular in form.

Two six-spoked *stūpas*, Sites 30 and 32 A, situated close to each other, had diameters of between 27 and 28 ft. The *āyakas* of Site 30 (pl. XLIV B) may be termed as incipient platforms. The other one, Site 32 A, had *āyaka*-platforms, measuring 6 ft. ×1 ft. 2 in. It is unlikely that any pillar could have been installed on a platform with such a narrow width. Site 30 was without any *mandapa* or *chaitya-griha*. On the other hand, Site 32 A revealed a Buddha-*chaitya* oblong in shape, probably a later addition. As the monastery of Site 30 had only three cells, a guess may be hazarded that it was the monastery of dissenters who separated themselves from the original monastery of Site 32 A. If that is correct, the six-spoked *stūpas* would stand as a symbol of common inheritance. At the same time, it is worth noting that none of the four- or six-spoked *stūpas* had a diameter of more than 28 ft.

Eight-spoked *stūpas* were ten in number, excluding Sites 5 and 9, both having double concentric circles. The *stūpa* of Site 5 had two concentric rings of eight and twelve spokes, respectively with diameters of 24 ft. and 49 ft., besides a hub, 4 ft. 4 in. square. The core of the *stūpa* was divided into twenty chambers, eight in the inner and twelve in the outer rings. The *stūpa* in Site 9 as well had two concentric circles with 24 ft. and 41 ft. 9 in. diameters and with eight and sixteen spokes respectively. But the builders of the *stūpas* of Sites 6 and 21, each with a diameter of more than 50 ft., did not feel the necessity of having more than one circle, which may imply that the outer rings of the *stūpas* of Sites 5 and 9 were afterthoughts.

It is apparent from the above that the number of spokes in a *stūpa* was largely subservient to its dimensions. *Stūpas* having more than 28 ft. diameter had invariably eight spokes. Conversely, those of less than 28 ft. in diameter generally had either four or six spokes. The numbers of spokes had thus a constructional utility. At the same time, as stated above (p. 78) the possibility of the numbers being symbolic representations of particular episodes of Buddha's life or of aspects of his teachings may not altogether be ruled out. This possibility is apparent in the ten-spoked *stūpa* of Site 16, measuring 47 ft. 3 in. in diameter, with a solid circular hub of as large as 12 ft. 6 in. diameter: a *stūpa* of such dimensions could easily have been constructed on eight spokes, such as the larger *stūpas* of Sites 6 and 21. Similarly, from the structural point of view, four spokes would have sufficed in those *stūpas* which have six.

A few miscellaneous facts about the *stūpas* may be noted here. There is not a single six-, eight- or ten-spoked *stūpa* without *āyaka*-platforms, though the platforms might not always have carried *āyaka*-pillars. Only those without spokes and a few four-spoked ones did not have any platforms. *Stūpas* carved on the drum-slabs often display railings around them. In all probability, the *Stūpa* of Site 1 had a circular railing. It is equally true that many *stūpas* were definitely without railings. Some *stūpas* were built on high square platforms; at least half-a-dozen stood on hillocks.[1] Needless to say, some *stūpas* were highly

[1]It is curious, however, that no establishment of the Apara-mahāvina-seliyas was erected on a hill in spite of the name of the sect being associated with *śaila* ('hill').

decorated, the decoration extending over the full length of the hemisphere (pl. XLVII); the drum-portion was generally encased with sculptured slabs.

Both the *stūpas* of the Theravādin sects, Sites 38 and 43, were small in size. Possibly they did not put so much emphasis on the main *stūpa* as the Apara-mahāvina-seliyas, Bahuśrutīyas and Mahīśāsakas. Despite the fact that Sites 6, 20 and 21 were without any *maṇḍapa* and apsidal temple, the *stūpas* here were of large dimensions. This prominence given to the *stūpa* may be, as already hinted (above, p. 78), the characteristics of the Apara-mahāvina-seliyas or the Chaityakas.

Stūpas with wheel-shaped plans appear to belong to an evolved stage of *stūpa*-architecture. The *stūpa* of Amaravati had a solid core. The gigantic *stūpa* at Bhattiprolu, of the second century B.C., also approximates the solid variety, though its central portion is wheel-shaped. Here one sees the beginnings of this style in Āndhra-deśa. Let it be mentioned here that this type is not confined only to this region. A phase of the Dharmarājikā *stūpa* at Taxila was irregularly wheel-shaped on plan;[1] also wheel-shaped was the *stūpa* of Shāh-jī-kī-Ḍherī at Peshawar.[2] A *stūpa* at Baṛā-Pahāṛī near Patna had a similar 'wheel-like arrangement of the walls.'[3] Nor is this feature universal in Āndhra-deśa, for it is absent at such Buddhist sites as Salihundam, Ramatirtham and Sankaram, though it possibly exists at Kotturu and Kodavali, in Districts Vishakhapatnam and East Godavari respectively, the latter datable to the Sātavāhana period.

The constructional advantage of wheel-shaped *stūpas* has already been discussed by Rea, who observes: 'In small structures where sinking of the foundations, and consequent fracture of the masonry is not liable to occur, an earthen packing may be perfectly safe; but in large domes, any sinking of the wall may cause cracks which admit moisture, when the expansion and contraction of the material is certain to cause the destruction of the dome. In some cases, this has been obviated by brick, concrete, or stone floors stretching across the interior at intervals in the height. Examples occur at Jaggayyapēṭa, Garikapāḍu and Peddagañjām. Others have cross-walls in the interior with a mud-packing. Examples are at Ghaṇṭaśālā and Peddagañjām. Solid domes are found at Guḍivāḍā and Bhaṭṭiprōlu; and these are undoubtedly the earliest of these *stūpas*.' This experiment might have been irrespective of any doctrine, but difference of opinion was liable to creep in amongst different sects about its adoption; a few might have preferred the earlier mode of solid construction, while others did not hesitate to accept it. Thus, the Mahīśāsakas, Bahuśrutīyas and Apara-mahāvina-seliyas followed the new technique, which could be given a doctrinal colour by them. Some Theravādins like the Mahāvihāra-vāsins refused to make any concession, though some groups within the Theravādins might have kept pace with the times by adopting this new architectural feature.

Even the *āyaka*-platforms are not peculiar to Āndhra-deśa. The recent excavation at Vaiśālī[4] has brought to light remains of a *stūpa*[4] with such platforms. Though a projection, somewhat similar to the *āyaka*, is found on only one side of the *stūpa* hewn out of a rock at Sankaram,[5] it is not noticed at sites like Ramatirtham[6] and Salihundam. The

[1]Marshall, *op. cit.* (1951), p. 236 and pl. 45.

[2]*An. Rep. Arch. Surv. Ind., 1908-09* (1912), p. 48. The Nirvāṇa *stūpa* of Kasia (Kuśinagara) may have had a *svastika* in the core, though the available report may refer to a four-spoked wheel, *ibid., 1910-11* (1914), p. 64.

[3]*An. Rep. Arch. Surv. Ind., Eastern Circle, for 1915-16* (Calcutta, 1916), p. 32. Information from Shri A. Ghosh.

[4]*Indian Archaeology 1957-58—A Review* (1958), p. 10 and pl. VIII B.

[5]*An. Rep. Arch. Surv. Ind., 1908-09*, pls. LXII and LXIII.

[6]*Ibid., 1910-11*, pl. XL.

fact that *stūpas* with wheel-base and with *āyaka*-platforms are discovered at or near Vaiśālī may vaguely be ascribed to the spread of the Mahāsaṅghikas, who had their original stronghold at Vaiśālī and from whose doctrines the Śailas (including the Aparamahāvina-seliyas) derived theirs.[1]

6. THE MONASTERIES

At the initial stages the residential part of an establishment at Nagarjunakonda formed an independent unit, though situated close to the corresponding place of worship. For example, at Site 1 the *mahāvihāra* was quite distinct from the *mahāchaitya* and the adjoining *chaitya-gṛiha*. Sites 6, 20, 21, 27, 28, 30, etc. (pl. XLVIII) had the main *stūpa* at some distance from the *vihāra*, the whole complex being surrounded by a compound-wall. Even at Sites 5, 7-8, 9, 15, 24, 26, 43, 54, 105 and 106 the residential portion was separated from the *stūpa* or *chaitya-gṛiha*. Such an arrangement may suggest the division of each establishment into two main components, viz., portions accessible and not accessible to the commoners. *Chaitya-gṛihas* were, at the beginning, situated in the area accessible to the public, but subsequently they became part and parcel of the residential area, the typical examples being Sites 2, 3, 4, 23, 85, and 105. Obviously, the worship of the *stūpa* or the image of Buddha inside *chaitya-gṛiha* was given more importance in the tenets of certain sects than the *stūpa* proper, which, with its gradually-diminishing size, possibly became only the object of veneration primarily of the lay-worshipper. When the Bahuśrutīyas started worship of Buddha, the shrines were constructed within the residential part. Site 38, belonging to the Mahāvihāra-vāsins, was an exception in all respects, because whereas at other sites the *stūpa* stood in an area accessible to all, at this site even the *stūpa*, not to speak of *chaitya-gṛiha*, was surrounded by a four-winged *vihāra*. Such variations in the general lay-out are difficult to explain but would obviously reflect a particular type of attitude. It is well-known that the Theravādins at first were not in favour of giving the laity a prominent place in their scheme.

The Bahuśrutīya monastery, Site 5, was one of the largest at Nagarjunakonda, so far as the number of cells is concerned. It had at least twentyeight cells, besides an oblong Buddha-shrine and three special chambers, two of which were circular externally and square internally and the third oblong. These chambers might have been meant for the *āchārya*, *vinaya-dhara*, etc., who might have preferred to have separate cells of their own. But this was, again, a new development, since the *mahāvihāra* of Site 1 did not have any such chamber. Even the Mahīśāsaka and Mahāvihāra-vāsin monasteries, Sites 7-8 and 38, have more or less uniform cells. Site 26, almost identical on plan with the Bahuśrutīya, also possessed two such special chambers. The number of such rooms at Site 32 A was three and all of them had stone benches, thereby suggesting their use as residential cells. It is, therefore, fairly certain that leading monks of certain sects maintaind some aloofness from the rest.

The number of monastic cells varied from two to thirty or even more.[2] Site 86 had two cells and was the smallest unit. Sites 27 and 30 had each three cells and Site 108

[1] Nalinaksha Dutt, *Aspects of Mahāyāna Buddhism and its Relation to Hīnayāna* (London, 1930), pp. 21-22.

[2] According to the *Mahāvagga*, IX, 4, 1, Sacred Books of the East, XVII (1882), p. 268, there are five kinds of *saṅghas*, variously consisting of four, five, ten, twenty and more than twenty persons. According to the *Chullavagga*, VII, 5, 1-2, *ibid.*, XX (1885), pp. 265-67, nine dissenters are sufficient to create a schism (*saṅgha-bheda*) and thereafter they may perform their rituals independently; four dissenters can cause a dissension (*saṅgha-rāji*).

five. As already stated (above, p. 80), Sites 27 and 108 each had four-spoked *stūpas* without *āyaka*-platforms and Site 30 a six-spoked one. These small units may be the monasteries of the schismatics. Site 108 would exhibit certain features very similar to Site 38, whereas Sites 27 and 30 might have belonged to the dissident groups of Sites 32 B and 32 A respectively, though this is only a conjecture. There were monasteries with arrangement for the accommodation variously of nine, ten, twelve, thirteen, fifteen, sixteen, nineteen, twenty, twentyone and twentytwo persons. The *mahāvihāra* of Site 1 had twentyfive cells and, as stated above (p. 82), the Bahuśrutīya monastery, Site 5, had twentyeight normal cells. The largest unit was Site 32 A, to provide room for 30 persons. Approximately, the size of the monastic population of Nagarjunakonda, which naturally might have included temporary inhabitants, was about four hundred and fifty. The size of the individual cells varied from 7 to 9 ft. The developed units, e.g. Sites 3 and 4, had refectories, store-rooms, etc., attached to the monasteries.

A *maṇḍapa* or the congregational hall was absent at Sites 2, 20, 21, 27, 30, 38 and 105; what this absence actually means is not easy to surmise. Though the western half of Site 32 A is generally said to have been a nunnery, the evidence is not definite; in fact, it is not possible to identify any nunnery, even though the testimony of inscriptions may suggest the presence of nuns at Nagarjunakonda.

7. CONCLUSION

The history of the monastic development at Nagarjunakonda thus discloses a complicated picture. The first wave of Buddhism that reached the valley was, broadly speaking, a mixed Hīnayāna Buddhism, to use Dutt's terminology.[1] The earliest *mahāchaitya* was that of the Apara-mahāvina-seliyas, built in the sixth regnal year of Vīrapurushadatta. There are evidences to prove that the worship of the Buddha-image was not originally in their tenets; nor did they favour the construction of the apsidal temple. Possibly they did not even approve the idea of representing Buddha in human form. Like the Chaityakas or Lokottara-vādins they gave special prominence to the worship of the *chaitya* (*stūpa*): one could acquire merit by the erection, decoration and circumambulation of the *chaitya* and by offerings of flowers, garlands, etc., to it. The path for acquiring piety was not complicated, and one may detect in such doctrines the urge of the sects to bring into their folds as many adherents as possible. These Lokottaravādin trends, in some form or the other, were pursued by the majority of the sects of Nagarjunakonda. Some of the Theravādin sects were, however, an exception, as their *stūpas* did not attain any great distinction; nor did they construct *stūpas* with *āyaka*-platforms. There is a possibility that a few of these sects were even against the idea of the wheel-shaped *stūpa*. But the Mahīśāsaka Theravādins, who were the only sect which preferred the double *stūpa* to the *chaitya-griha*, gave more importance to the *stūpa* than even the Apara-mahāvina-seliyas and the Bahuśrutīyas By far the largest number of Buddhists adhered to the original Apara-mahāvina-seliya type of establishments similar to Site 1 (early phase), comprising the *stūpa* proper and residential cells. The *Mahāvastu*, the *vinaya* of the Lokottaravādins, portrays somewhat a similar picture of an age when the Lokottara conception of Buddha had not yet taken hold on the people's mind: Buddha had already been deified but was not represented in anthropomorphic form.[2] In all likelihood, the Lokottaravādins, at least in the beginning of their career, had a predisposition for symbolic representation of Buddha. The Apara-mahāvina-seliyas introduced almost an identical tradition at Nagarjunakonda.

[1] Dutt, *op. cit.* (1930), p. 4.
[2] *Ibid.*, p. 25, and (1945), pp. 293-98.

A study of sculptures from the different sites should normally throw light on this aspect of development, but the chronological sequence of the earlier collection in the local Museum has not been studied. It appears to the present writer that some sites, such as Sites 1 and 6, had practically no piece where Buddha was shown in human form. There is only one drum-slab with Buddha-figure in the Museum which is recorded to have been picked up from Site 6, but the style of its execution is different from that of other examples from the same site. In this slab the Bodhi-tree is depicted behind the scene of Buddha's First Sermon in the Deer Park, but this motif appears to be the characteristic of the sculptures from the *stūpas* of Sites 2 and 3. Sculptures from Site 1 (pl. XLVI) exhibit only symbolic representations of Buddha. Thus, the authors of Sites 1 and 6 (pl. XLVII) did not possibly favour the carving of Buddha in anthropomorphic form. Let it be emphasized here that the symbolic representation does not necessarily imply a high antiquity, for it might have been inherent in the faith of a particular sect.

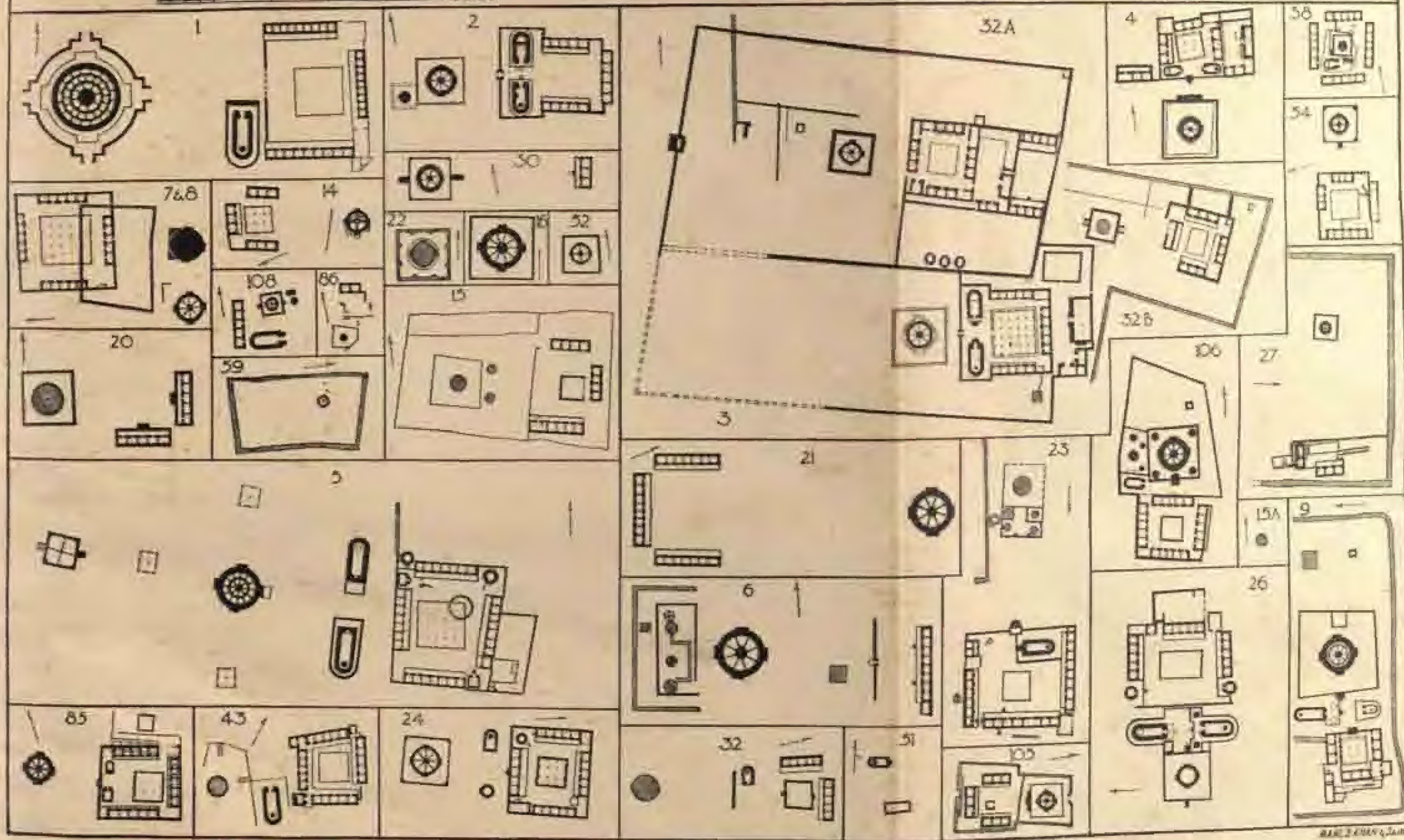
That some section of the Apara-mahāvina-seliyas acceded to the idea of image-worship during the eighth regnal year of Ehuvala Chāṁtamūla is evident from a mutilated Buddha-image from a *chaitya-gṛiha* of Site 9, belonging to that year. The Mahāvihāra-vāsins, and the Bahuśrutīyas also followed suit (above, p. 69). Sects inhabiting Sites 2, 3, 4 and 106, which yielded the best specimens of sculptures, were also believers in image-worship. They often represent Buddha in human form, and each site had a *chaitya-gṛiha* meant for the icon. The Mahīśāsakas, like the original Apara-mahāvina-seliyas, did not yield to the popular demand of image-worship. A stage, however, came in the development of Buddhist establishments at Nagarjunakonda when both the *chaitya-gṛihas* (Site 85) were adorned with images, neither of them being reserved for a *stūpa*.

During this period of idolization, *stūpas* were possibly relegated to the background and at some sites the apsidal shrine became the most imposing edifice. In other words, the temple-concept gained greater currency. During the latter part of the rule of Vīrapurushadatta both the Theravādins as well as the Apara-mahāvina-seliyas allowed *chaitya-gṛihas* to come up. It was possibly Bodhiśri, the lay-worshipper from Gova-grāma, who introduced the *chaitya-gṛiha* at Nagarjunakonda (above, p. 69). At that time this conception might not have had any far-reaching effect on the prevailing doctrines of the different sects. At the next stage, controversy as to the relative importance of the *chaitya-gṛiha* and the main *stūpa* might have arisen. Subsequently, *chaitya-gṛihas* were raised within the precincts of the residential enclosure. Thus, the emphasis was transferred from the *stūpa* to the shrine.

The image-worship and the concomitant apsidal and, later on, square or oblong shrines were steps towards further popularization of Buddhism. The creed and ideology of different sects except the Mahīśāsakas and the original Apara-mahāvina-seliyas, who stood firm against the tide, had to undergo metamorphosis in order to make room for these changes, which were the general trend of the time. Such changes reflected themselves in the monastic set-up and plastic art as well.

[*Received on the 15th May 1960.—Ed.*]

Postscript: The author desires me to record here the recent (1962) discovery at Nagarjunakonda of an inscription of Vijaya Sātakarṇi, a late Sātavāhana ruler. It runs to four lines and reads as follows: *namo bhagavato aga-pogalisa raño Gotami-putasa siri-Vijaya-Satakaṇṇisa sava 8 gi pa 4 diva Vesākha-puṇima.* The inscription seems to be incomplete but is certainly Buddhist in affiliation, as it begins with salutation to *aga-pogali*, an epithet of Buddha (cf. *Ep. Ind.*, XX, p. 26); the date, the full-moon of Vaiśākha, is also significant. There is therefore no doubt that Buddhism had penetrated into the Nagarjunakonda valley even in pre-Ikshvāku days.—Ed.


STŪPAS & MONASTERIES AT NAGARJUNAKONDA
64 32 0 64 128 192 256 FEET
200 100 0 200 400 600 800 METRES
1
2
32A
4
54
30
7&8
14
22
16
52
108
86
15
20
59
3
32B
106
27
21
23
5
15A
9
6
26
85
43
24
32
51
105

To face p. 84

TECHNICAL SECTION

Preservation of a miniature and a wall-painting

By T. R. Gairola

IN THIS ARTICLE IT IS INTENDED TO GIVE THE DETAILS OF THE EXAMINATION AND PRESERVATION of a miniature painting and a tempera wall-painting. It will be seen from this how certain evidences and opportunities can be utilized to collect relevant data for the scientific examination and preservation of old paintings.

1. MINIATURE PAINTING

It is an eighteenth-century painting of the Deccani School (Hyderabad). The painting was on the back of another contemporary painting and was covered with four layers of paper, being thus completely hidden. This seems to have been done in order to provide a firm support for the painting which was very fragile and was showing cracks and tears, especially in the green pigmented areas. The dirty-green, blackening and charring effect of green pigment in certain Mughul, Rājasthānī, Deccani and other school miniatures and illustrated manuscripts is well-known to custodians of this material. This malady gets so much advanced in some cases that the support is ultimately reduced to dust, and gaps and losses are caused. As a matter of fact, the green colour first loses its tone-effect, then becomes dirty-green and blackish and finally causes the crumbling of the support. In case there are three, four or more layers of paper applied at the back of a painting to prepare a firm support, the blackening effect is carried through all of them, and many a time simply by examining the back of the painting it can be found where the green pigment has been used in the painting on the front.

Verdigris, which in chemical terminology is called basic copper acetate and in the Indian artist's terminology *zangar*, has been one of the favourite green pigments used by the artists in Europe and in India. A.P. Laurie[1] mentions its use as an artist's material between the fifteenth and nineteenth centuries. The mode of its preparation was known in very early times in Europe[2], and there are references in certain Indian texts[3] also describing the method of its preparation for artist's use. It is stated to have been prepared by the action of vinegar on copper scrapes. Verdigris is acidic in nature and is reported to be a notoriously unstable substance.[4]

[1] A. P. Laurie, *The Painter's Methods and Materials* (London, 1947).

[2] Rutherford J. Gettens and G. L. Stout, *Painting Materials—A Short Encyclopaedia* (New York, 1947).

[3] *Asraru'l-Khat—a Treatise of the Seventeenth Century dealing with the Art and Technique of Calligraphy*, ed. Md. Fazalullah Ansari.

[4] W. G. Constable, *The Painter's Workshop* (Oxford, 1954).

References to pure green colour in Sanskrit texts are not many.[1] Where they exist, the recipe for green colour is the mixture of yellow and blue colours. Some of them are given below:—

1. Indigo mixed with orpiment yields green.
2. Orpiment mixed with deep-brown gives the shade of a parrot's feather.
3. Indigo, peori, lac-dye, black ink and red lead yield mango-green.
4. Orpiment and indigo also give mango-leaf green.

The miniatures and manuscripts in which this charring effect is noticeable show a high acidity-content at the relevant places and the green gives positive test for copper, as examined by micro-chemical (benzoin and salicylaldoxime) tests. Thus, supported both by literary evidence and chemical tests, the blackening and charring effect of green in the paintings is attributable to the use of verdigris in these illustrations. Irreparable damage and loss are caused to the painting by this pigment.

It was the quest for the examination of this green pigment in this particular painting that gave clue to the fact that there was another painting on its back. The painting was fragile and was found to have been strengthened by giving several layers of paper at the back. The blackened spots at the back were found to be highly acidic, and the effect of the pigment was found carried to the back side; but it did not correspond to the green pigment of the painting on the front. It showed outlines of some definite features quite different from the painting on the front side.

The front side of the painting was given a preservative coating with ·5 per cent methyl-metha-crylate solution, and when this coating had dried, a Nepalese tissue-paper was put on it. It was then placed on a glass-sheet with the reverse exposed. The back side was damped with water and the first layer of paper removed carefully with the help of an artist's spatula. Encouraging results were obtained and better outlines of the blackening effect were now noticeable. On further moistening it at the back the other layer was removed, and then the presence of another painting at the back was rendered clear. Pl. XLIX A shows how the blackening effect of the green pigment had been carried at the back of two layers of papers and gave clue of a painting underneath with green pigment. These two layers were also removed and the painting dried between absorbent paper under pressure.

When the painting had dried, another coating of ·5 per cent methyl-metha-crylate solution was given. It was then given an alkaline bath in ·1 per cent lime-water to eliminate the acid-effect and thereafter washed free of alkali. The painting was fragile, and as both the sides were painted it was mounted on one side on transparent nylon-gauge, supported by proper paper-margins to balance the strain caused by the nylon-fabric. Pl. XLIX B shows its condition after preservation. As even this composition was not considered sound enough for the proper preservation of the painting, it was mounted between sunken-window mounts.

2. TEMPERA WALL-PAINTING

This fragmentary tempera wall-painting is from the collection of wall-paintings brought by Sir Aurel Stein from his two Central Asian expeditions of archaeological and geographical research, extending over the periods 1906-1908 and 1913-16 and now forms part of the collection of the National Museum, New Delhi. It resembles in every respect

[1] Moti Chandra, *Jain Miniature Paintings from Western India* (Ahmadabad, 1949).



A



B

Deccani painting: A, *before preservation, showing outlines of charring effect on the back;* B, *after preservation.* *See p. 86*

To face p. 86



B



A

Wall-painting from Central Asia: A, before preservation; B, after preservation. *See p. 87*

TABLE

DATA FOR CENTRAL ASIAN WALL-PAINTINGS

SITE AND LOCATION	Miran (Lat. 39·5°N.; Long. 89°E.)	Kizil (Lat. 38·5°N.; Long. 76·5°E.)	Tunhuang (Lat. 40·2°N.; Long. 95°E.)		Bezeklik (Turfan) (Lat. 43°N.; Long. 89°E.)
			Wan-Fo-Hsia caves	Wei caves	
PERIOD	Third-fourth century	Sixth-seventh century	Eighth-ninth century	Fifth century	Eighth-ninth century
GROUND	Loess with leaves, reed-stem and a thin coat of burnt gypsum	Clay-wall overlaid with layer of gypsum	Clay finished with a coat of kaolin mixed with chalk	Mixture of china clay (kaolin) and chalk containing iron oxide	Coarse support of mud containing lime, husk and fibre and ground of clay and gypsum
WHITE	Burnt gypsum	Gypsum	Lead	Kaolin, white lead blackened by oxidation	Gypsum
YELLOW	Yellow ochre	..	Gamboge	..	..
GREEN	Malachite	Copper present but not malachite	Malachite	Malachite	Malachite
BLUE	..	Ultramarine	Azurite indigo	Ultramarine	..
BROWN	..	..	..	..	Suenna
RED	Ferric oxide	Native ferric oxide and red lead	Lead, red ochre and vermilion	Vermilion madder	Red lead
BLACK	..	..	Carbon	Carbon	Carbon
EXAMINER AND ANALYST	A. Church	Rutherford J. Gettens	Rutherford J. Gettens	A. E. Werner	Carbon
REFERENCE	*Serindia* (Oxford, 1921)	*Technical Studies*, VI, (Fogg Art Museum, Harvard, April 1938)	Basil Gray, *Buddhist Cave-Paintings at Tun-huang* (London, 1959)		National Museum, New Delhi

the Bezeklik wall-paintings of Turfan (Lat. 43°N.; Long. 89°E.) belonging to the eighth-ninth century. Pl. L A shows its condition before it was taken up for preservation.

Before preservation was attempted, a scientific examination of the painting was carried out. The pigments used in the painting are red, black, green, white and brown. The support was coarse and consisted of mud containing lime mixed with husk and fibre, the ground being gypsum ($CaSO_4$). The white pigment is also gypsum and the green shows the presence of copper and may be malachite. The red pigment shows the presence of lead and may be red lead. The brown is sienna and black carbon-black. Wall-paintings from Central-Asian sites, such as Miran, Kizil and Tunhuang (Wan-Fo-Hsia and Wei caves), had been examined earlier, and it would be interesting to make comparative study of these along with this Bezeklik painting. The data derived out of the study are given in the Table on p. 87.

For preservation the different pieces of the painting were cleaned of all surface-dirt and mud-accumulation with a soft Chinese paint-brush, making use of an aqueous mixture of rectified spirit. The adhesive of the pigments seemed to have been decomposed: they were loose, falling off, and coming out on the tip of the finger when touched. After the cleaning process was completed the pieces were given two successive coatings of preservative solutions in order to fix the colours. This having been done, they were protected from the front side with tissue-paper saturated with thymol-solution, and a sheet of glass was placed over it and turned upside down.

Most of the mud, husk and fibre was scraped off carefully till only about $\frac{1}{4}$ in. of them was left. Then a thickness of plaster of Paris $\frac{1}{16}$ in. was built up over the mud-backing and an aluminium netting buried under another $\frac{3}{16}$ in. thick layer of plaster of Paris laid over it. All this was done in such a way that a margin of about $1\frac{1}{4}$ in. all round was left. When the thus-formed panel had dried for two days, it was turned back to expose the painted side. The covering tissue-paper was removed and an aluminium-frame provided to hold the painted panel securely. After the complete drying up of the painting the gaps as well as borders were given a neutral tint with oil-paint. Pl. L B shows its condition after preservative treatment.

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